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Weather and Radar Processor (WARP) Test and Evaluation Master Plan (TEMP)

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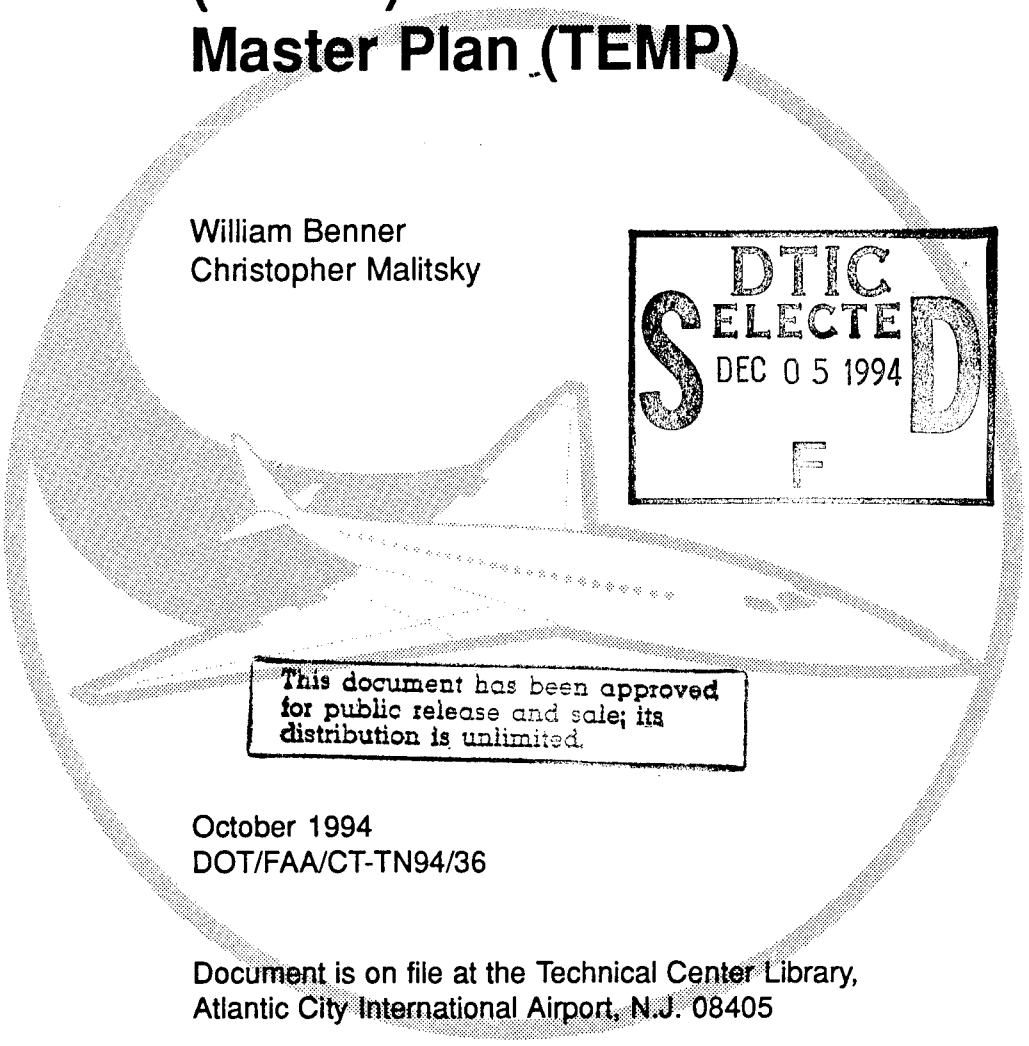

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16. Abstract

This Test and Evaluation Master Plan (TEMP) describes the Test and Evaluation (T&E) processes which will be used to ensure the Weather and Radar Processor (WARP) system meets the requirements allocated to the project in the NAS-SS-1000, volumes I, II, and V, the NAS-SR-1000, and the WARP System Specification, FAA-E-To Be Determined (TBD). This TEMP defines test strategy, test requirements, and organizational roles and responsibilities and is developed in accordance with Federal Aviation Administration (FAA) Order 1810.4B and FAA-STD-024a.

This version of the TEMP addresses the testing requirements for the first two stages of WARP. This TEMP will be updated with additional detail when the WARP program Stage 1, 2, and 3 NAS Change Proposals (NCP) are developed and as the program progresses through the KDP 3 and KDP 4 phases. The original TEMP and its revisions will be submitted for approval by the Test Policy Rules Committee (TPRC).

A WARP system will be deployed in all Air Route Traffic Control Centers (ARTCC) and at the Air Traffic Control System Command Center (ATCSCC). It is an Nondevelopmental Item (NDI)-based automated interactive meteorological data and information processing service that will serve as the primary source of real-time tactical and strategic weather data for air traffic controllers, traffic management unit (TMU) coordinators and area supervisors, meteorologists, and pilots. The WARP system will provide real-time mosaicked WSR-88D products to the air traffic controllers.

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EXECUTIVE SUMMARY

This prespecification Weather and Radar Processor (WARP) Test and Evaluation Master Plan (TEMP) lays the foundation for WARP test strategy, resources, and implementation responsibilities. The test efforts governed by this TEMP will ensure the WARP system meets the system and subsystem requirements allocated to the project in the NAS-SS-1000, volumes I, II, and V; the NAS-SR-1000; and FAA-E-To Be Determined (TBD), the WARP System Specification. The Federal Aviation Administration (FAA) TEMP further describes the Test and Evaluation (T&E) components for meeting program objectives for each acquisition phase. WARP will follow the procedures for Operational Test and Evaluation (OT&E) stated in FAA Order 1810.4B. The WARP program has been designated to have ATQ-1, Independent Operational Test and Evaluation (IOT&E) Oversight.

The WARP procurement intends to implement a three-stage acquisition approach. The WARP acquisition will be for an NDI-based state-of-the-art technology weather system with development required to support the WARP National Airspace System (NAS) interfaces and the unique Weather Surveillance Radar 1988 Doppler (WSR-88D) radar products required. The program received Key Decision Point 3 (KDP 3) validation due to the consolidation of the Real-Time Weather Processor (RWP) and Meteorologist Weather Processor (MWP) functional requirements. This version of the TEMP addresses the testing requirements for the first two stages of WARP. An updated TEMP will be developed with additional detail (Stage 3) as the program progresses, through the KDP 3 and KDP 4 phases, to ensure compliance with program objectives. This TEMP and subsequent revision(s) will be submitted for approval by the Test Policy Review Committee (TPRC). The results of both Development Test and Evaluation (DT&E) and Operational Test and Evaluation (OT&E) testing will be utilized as input to a deployment recommendation decision.

1. PURPOSE.

The purpose of this Test and Evaluation Master Plan (TEMP) is to define the overall Test and Evaluation (T&E) phases necessary to ensure the integration of the Weather and Radar Processor (WARP) within the environment of the National Airspace System (NAS).

This TEMP describes the T&E processes which will be used to ensure the system meets the requirements allocated to the project in the NAS-SS-1000, volumes I, II, and V, the NAS-SR-1000 and the FAA-E-To Be Determined (TBD). This TEMP defines test strategy, test requirements, and organizational roles and responsibilities, and is developed in accordance with FAA Order 1810.4B and FAA-STD-024a. A test Verification Requirements Traceability Matrix (VRTM) which presents high level functional and performance requirements to be tested during WARP T&E is included. These requirements are derived from NAS-SS-1000, volumes I, II, and V that are allocated to the WARP program.

This version of the TEMP addresses the testing requirements for the first two stages of WARP. The program received Key Decision Point 3 (KDP 3) validation due to the consolidation of the Real-Time Weather Processor (RWP) and Meteorologist Weather Processor (MWP) functional requirements. This TEMP will be updated with additional detail when the WARP program Stage 1, 2, and 3 NAS Change Proposals (NCP) are developed and as the program progresses through the KDP 3 and KDP 4 phases. The original TEMP and its revisions will be submitted for approval by the Test Policy Review Committee (TPRC).

2. REFERENCE DOCUMENTS.

The following specifications, standards and documents constitute a part of this TEMP. The TEMP references NAS Interface Requirements Documents (IRD) that may need to be updated and modified, as applicable, to meet WARP interface requirements. Additional applicable reference documents are listed within the WARP System Specification (FAA-E-TBD) and Statement of Work (SOW). The latest revisions to all these documents, that are in effect at the time of issuance of the SOW, are to be considered the applicable reference documents, unless otherwise specified within this TEMP.

2.1 FAA DOCUMENTS.

2.1.1 FAA Specifications.

NAS-MD-110	Test and Evaluation (T&E) Terms and Definitions for the National Airspace System, March 27, 1987.
NAS-SS-1000	National Airspace System (NAS) System Specification, volumes I, II, and V, October, 1992.
FAA-E-TBD	Weather and Radar Processor System Specification,

FAA-E-2770C	National Airspace Data Interchange Network Packet Switch Network System Specification, September 25, 1992.

2.1.2 FAA Standards.

FAA-STD-024a	Preparation of Test and Evaluation Plans and Test Procedures, August 17, 1987.
FAA-STD-013b	Quality Control Program Requirements, September 28, 1989.
FAA-STD-018a	Computer Software Quality Program Requirements, September 30, 1987.
FAA-STD-026	NAS Air Space Software Development, August 4, 1993.

2.1.3 Other FAA Publications.

FAA Order CT 1710.B	Preparation and Issuance of Formal Reports, Technical Notes, and Other Documentation, February 13, 1990.
FAA Order 1810.4B	FAA NAS Test and Evaluation Policy, October 22, 1992.
FAA Order 1810.6	Policy for Use of Nondevelopmental Items (NDI) in FAA Acquisitions, November 13, 1992.
NAS-IR-21012515	Area Control Computer Complex to Weather and Radar Processor Interface Requirements Document, TBD.
NAS-IR-61002515	Area Control Facility to Weather and Radar Processor Interface Requirements Document, TBD.
NAS-IR-92020000	Coded Time Source/User Systems Interface Requirements Document, July 30, 1991.
NAS-IR-51035101	Remote Monitoring Subsystem to Maintenance Processor Sub-system Interface Requirements Document, July 30, 1993.
NAS-IR-25152508	Weather and Radar Processor to AWOS Data Acquisition System Interface Requirements Document, TBD.
NAS-IR-25072515	Weather Message Switching Center Replacement to Weather and Radar Processor/Central Flow Weather and Radar Processor Interface Requirements Document, TBD.

NAS-IR-43020001	NADIN/X.25 Packet Mode User's Interface Requirements Document, February 20, 1991.
NAS-IR-21020000	Local Communications Network (LCN)/User System Interface Requirements Document, March 30, 1992.
FAA-XXXX	WARP Request for Proposal (RFP) package
TBD.	Weather and Radar Processor to Weather and Radar Processor Interface Control Document (TBD)
UNISYS 12083041	Next Generation Weather Radar (NEXRAD) RPG/Associated PUP Interface Control Document (ICD), Version 1.

2.2 OTHER STANDARDS.

CCITT Recommendation X.25	Interface between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Terminals Operating in the Packet Mode on Public Data Networks, 1984.
ISO/OSI 7498	Information Processing Systems-Open Systems Interconnection-Basic Reference Model, October 15, 1984.
ISO/OSI 8073	Information Processing Systems-Open Systems Interconnection-Oriented Transport Protocol Specification, November 14, 1989.

2.3 MILITARY AND FEDERAL PUBLICATIONS.

2.3.1 Military Specifications.

None used.

2.3.2 Military Standards.

MIL-STD-461C	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference.
MIL-STD-470B	Maintainability Program for System and Equipment, 30 May 1989.
MIL-STD-785B	Reliability Program for Systems and Equipment Development and Production, 15 September 1980.

MIL-STD-1472D — Human Engineering Design Criteria for Military Systems, Equipment and Facilities, 1989.

2.3.3 Federal Standards.

DOD-STD-2167A — Defense System Software Development, 29 February 1988.

3. SYSTEM DESCRIPTION.

A WARP system will be deployed in all Air Route Traffic Control Centers (ARTCC) and at the Air Traffic Control System Command Center (ATCSCC). It is an NDI-based automated interactive meteorological data and information processing service that will serve as the primary source of real-time tactical and strategic weather data for air traffic controllers, traffic management unit (TMU) coordinators and area supervisors, meteorologists, and pilots. The WARP system will provide real-time mosaicked Weather Surveillance Radar 1988 Doppler (WSR-88D) products to the air traffic controllers. An automated weather data processing capability is a prerequisite for reporting of weather hazards to air traffic control (ATC) users and timely meteorological analysis of the enormous volume of available weather information. It will allow air traffic controllers, TMU coordinators, and area supervisors within the ARTCC and ATCSCC access to accurate and reliable information on current and forecast weather conditions to accomplish their mission of safely and efficiently regulating the flow of aircraft within the NAS. Using the Area Control Computer Complex (ACCC), the WARP will provide weather products to the Common Console. It will provide Center Weather Service Unit (CWSU) meteorologists the data assimilation, display, and manipulation tools necessary to analyze a wide range of official weather measurements, reports, and forecasts. It will allow meteorologists to identify weather conditions that may adversely impact ATC and aircraft operations within the airspace of interest, particularly potential weather hazards to aviation. The resulting meteorologist-created warnings and advisories must be immediately disseminated to traffic coordinators and other ATC users to enable, in a strategic sense, the safe separation and sequencing of aircraft in flight. Frequent updates from a multitude of weather sensors and reporting stations within the NAS must be merged and analyzed quickly upon receipt so that ATC users may be promptly notified of deviations in current conditions from a previous forecast guidance.

The WARP will provide:

a. routine dissemination of WSR-88D mosaics to air traffic controllers;

b. receipt of weather information from external sources and capability to process, store, and display those data;

c. receipt of radar weather data, weather satellite data, real-time lightning data, alphanumeric weather data, gridded binary weather data, and weather products from vendor supplied data sources;

d. receipt and transmission of weather messages over the Weather Message Switching Center Replacement (WMSCR) NAS subsystem;

e. creation of alphanumeric products, line graphics, and/or annotations to graphical products;

f. the CWSU the ability to disseminate manually created weather products to other NAS subsystems;

g. display terminals and interfaces to facilitate scheduled and on-demand CWSU briefings to ATC personnel.

The WARP will incorporate and improve upon the MWP functionality. To do this, the WARP will have the following capabilities:

a. process interactive meteorological data;

b. provide real-time WSR-88D products to the air traffic controllers;

c. acquire and display weather products not currently offered by MWP;

d. provide an improved meteorological workstation and briefing terminal display capability;

e. interface to NAS subsystems to ensure the effective dissemination of WSR-88D weather radar data, CWSU warning, and advisory products to ATC users.

3.1 MISSION.

The primary mission of the WARP is to provide real-time weather information to air traffic controllers via the ACCC. The WARP will also serve as the principal source of real-time weather data for TMUs and area supervisors, CWSU/Central Flow Weather Service Unit (CFWSU) meteorologists, and pilots. The WARP will provide weather information to assist in the proper sequencing and separation of aircraft. The WARP will also aid pilots in navigating efficient flight routes through controlled airspace. The WARP will accomplish this by providing terminal area and enroute weather.

3.2 SYSTEM.

The capabilities and functional and performance requirements for WARP are defined in the WARP System Specification, FAA-E-TBD. The acquisition of the WARP system will be comprised of three stages. This WARP TEMP addresses the acquisition strategy for the WARP stages 1 and 2.

WARP stage 1 will provide:

a. WSR-88D radar data to the ACCC interface for use by air traffic controllers;

b. interfaces with the WMSCR, Maintenance Processor Subsystem (MPS), Automated Weather Observation System (AWOS) Data Acquisition System (ADAS), and Coded Time Source (CTS) NAS subsystems;

c. a Nondevelopmental Item (NDI) state-of-the-art weather data analysis capability to replace the MWP system.

WARP stage 2 will provide full WSR-88D functionality to the workstation as per FAA-E-TBD.

3.2.1 Key Functions.

a. Data Collection: the WARP will collect weather radar image data, meteorological geosynchronous satellite imagery, graphic and alphanumeric weather data from the National Weather Service (NWS) and other sources, alphanumeric and graphic weather products and polar orbiter satellite imagery. Data is stored in the WARP and output to workstation and briefing terminals.

b. Data Distribution: the WARP will disseminate weather products, advisories, and status data to NAS subsystems (WMSCR, ACCC, MPS) and will distribute WSR-88D products to other WARPs.

c. Data Requests: the WARP will accept and process requests for weather data.

d. Alphanumeric Products: the WARP will automatically generate reformatted surface observation, terminal forecast, and grid winds and temperature forecast reports.

e. Manually Created Products: the WARP will provide the meteorologist the capability to manually create products including, but not limited to, Meteorological Impact Statements (MIS), Center Weather Advisories (CWA), General Information Messages (GIM) and Hazardous Weather Area Outline (HZW).

f. Mosaic Products: the WARP will provide mosaic maps depicting precipitation and point data derived from individual WSR-88D products for the Area Control Facility (ACF) area; and a national mosaic of the composite reflectivity products.

g. Depiction: the WARP will depict WSR-88D radar data and meteorological satellite data in image format, surface observation data, upper air observation or forecast data,and lightning data in vector or point format.

h. Weather Data Plots: the WARP will plot horizontal and vertical views of surface observation data, lightning data, upper air observation data, NWS alphanumeric products, grid winds, and temperature forecast data from external sources and Pilot Reports (PIREP).

i. Updating: the WARP will update its database to reflect current data from all sources.

j. Weather Alerts: the WARP will alert the meteorologist to hazardous weather conditions, hazardous weather products, and urgent PIREPs.

k. Conversions: the WARP will perform coordinate conversions on HZWs and Instrument Flight Rules (IFR) area outlines (IAO) for dissemination to NAS subsystems in the appropriate projections.

l. Database: the WARP will maintain a database of all received and generated products.

m. Archiving: the WARP will archive all products created by the WARP or meteorologist that are generated or disseminated to external NAS subsystems.

n. Manual Inputs: the WARP will accept adaptation or demand requests, alphanumeric and graphic annotations, new product data, display commands, and weather data parameters for alerts.

o. Data Display: the WARP will allow the user to overlay, zoom, pan, and animate graphics alone or in combination with one another on a color graphics display monitor.

p. Hardcopy: the WARP will provide the capability to produce color hardcopy of any product displayed at the WARP workstation and the briefing terminals.

q. Maintenance monitoring: the WARP will monitor its operational status and provide alarms to the meteorologist and the MPS subsystem when a failure is detected.

r. Fault detection: The WARP will detect and isolate system faults to the lowest replaceable item (LRI).

s. Adaptation requests: The WARP will allow the meteorologist to specify lists of commonly requested products for retrieval and to display and modify these lists.

t. Demand requests: the WARP will retrieve and display or distribute all products in response to a demand request.

u. Standard time sources: The WARP will receive and maintain timing synchronized to universal coordinated time (UTC).

3.2.2 WARP NAS Interfaces.

The NAS-SS-1000 specification will stipulate the following Stage 1 and 2 WARP/NAS and Central Flow Weather and Radar Processor (CFWARP)/NAS subsystem interfaces as referenced in figures 3.2.2-1 and 3.2.2-2:

a. Weather And Radar Processor (WARP);
b. Weather Message Switch Center Replacement (WMSCR);
c. External Coded Time Source (CTS);
d. Maintenance Processor Subsystem (MPS);
e. Area Control Computer Complex (ACCC);
f. AWOS Data Acquisition System (ADAS);
g. Area Control Facility (ACF);
h. Local Control Network (LCN).

3.2.2.1 WARP to WARP Interfaces.

3.2.2.1.1 ACF WARP to ACF WARP.

The interface between one WARP and other WARP(s) will be via National Airspace Data Interchange Network II (NADIN II) and will allow the WARP to routinely acquire WSR-88D individual radar products from WSR-88D(s) that are not directly connected to the WARP but which are required to provide radar coverage of the WARP's area of interest. The interface will also provide the WARP with the capability to request/reply WSR-88D radar products. The WARP will interface with other WARP(s) in accordance with the WARP to WARP interface control document (ICD-TBD), via NADIN II, in accordance with NAS-IR-43020001.

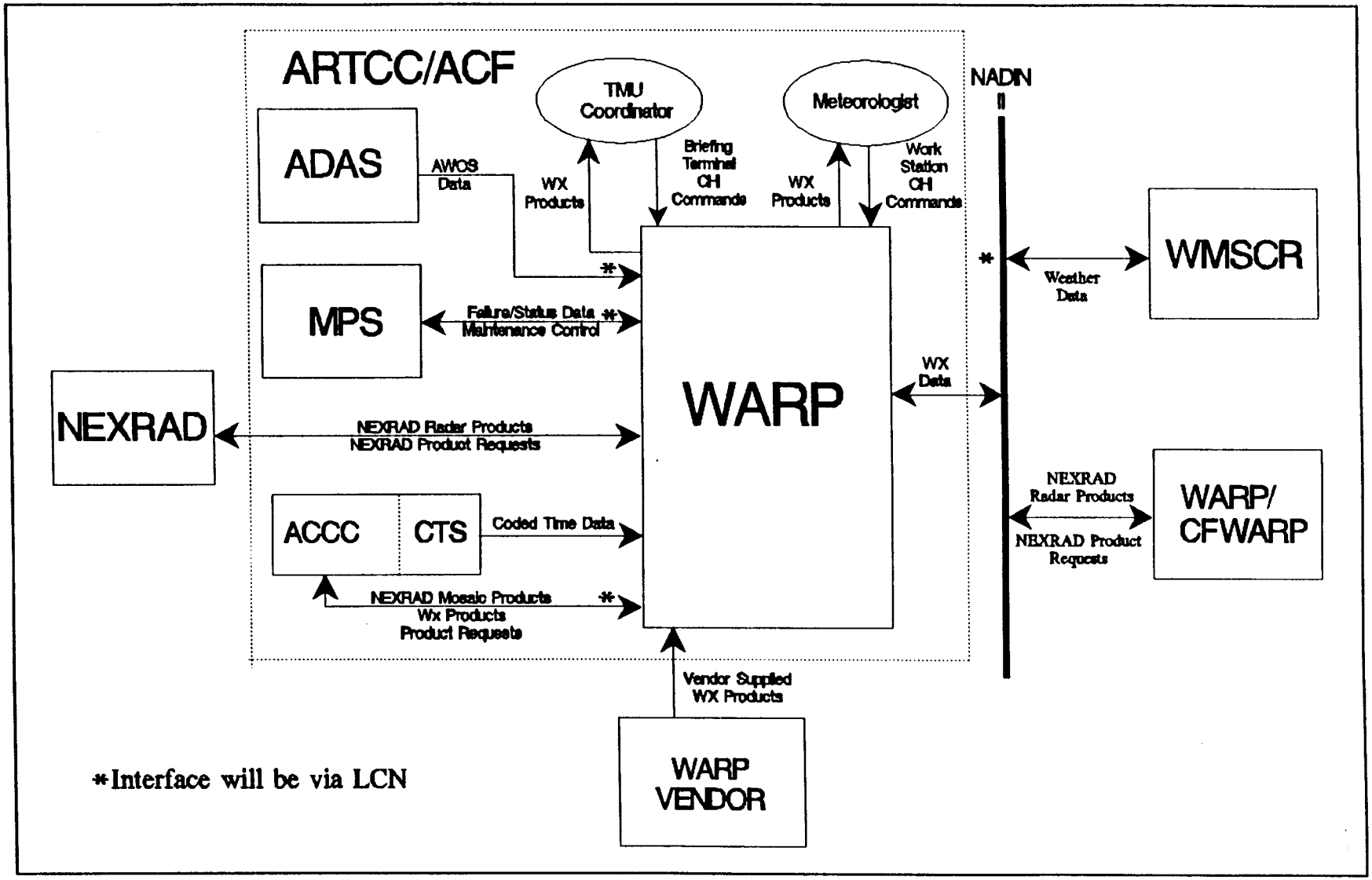

FIGURE 3.2.2-1. PHYSICAL NAS INTERFACES FOR WARP

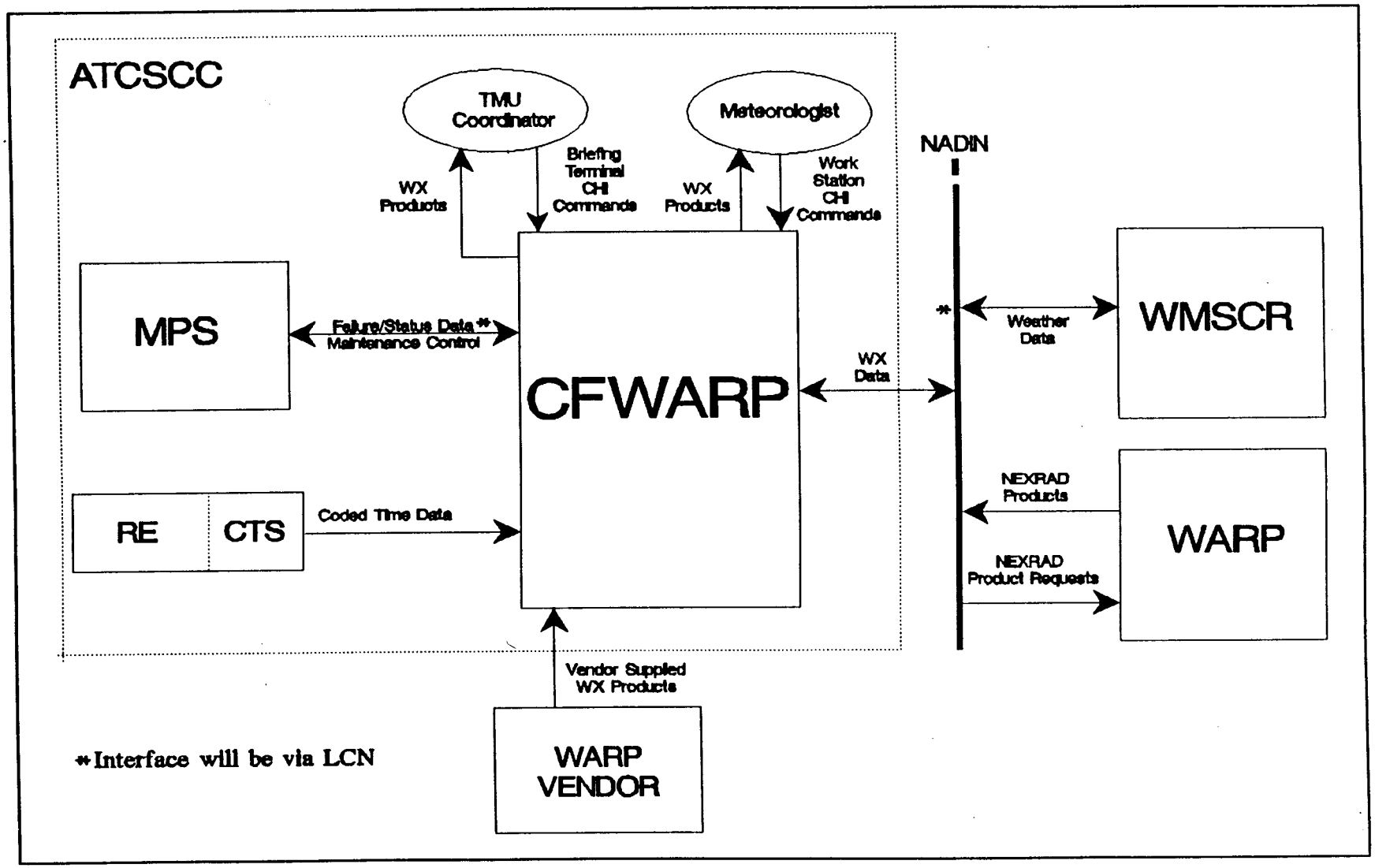

FIGURE 3.2.2-2. PHYSICAL NAS INTERFACES FOR CFWARP

3.2.2.1.2 ACF WARP to ATCSCC WARP.

The interface between an ACF WARP and ATCSCC WARP will be via NADIN II and will allow the ATCSCC WARP to routinely acquire ACF mosaic products from ACF WARP(s). The ATCSCC WARP will interface with ACF WARP(s) in accordance with the WARP to WARP interface control document (ICD-TBD), via NADIN II, in accordance with NAS-IR-43020001.

3.2.2.2 WARP to WMSCR Interface.

The interface between WARP and WMSCR will be via LCN and NADIN II and will allow the exchange of weather products between WARP and other NAS subsystems. Specifically, this interface will allow a CWSU to disseminate its generated warnings and advisory products, general information messages, or pilot weather reports to WMSCR for central storage and later receipt by other CWSUs and the CFWSU. In addition, this interface will allow the WARP to receive similar weather products from WMSCR that were generated at other CWSU sites, to receive surface weather observations from automated weather observing equipment, and to receive weather data from sources external to the NAS. The WARP will interface with the WMSCR in accordance with NAS-IR-25072515.

3.2.2.3 WARP to External Coded Time Source Interface.

The interface between the WARP and CTS will allow the WARP to synchronize to the NAS standard time reference with a minimum of 1-second resolution. The WARP will interface with the CTS in accordance with NAS-IR-92020000.

3.2.2.4 WARP to Maintenance Processor Subsystem.

The interface between the WARP and MPS will be via the LCN and will allow the WARP to provide status/failure data to the MPS system in accordance with NAS-IR-51035101.

3.2.2.5 WARP to Area Control Computer Complex.

The interface between the WARP and ACCC will be via the LCN and will allow the WARP to provide real-time WSR-88D radar mosaic products and other weather products to the air traffic controllers' consoles in accordance with NAS-IR-21012515.

3.2.2.6 WARP to AWOS Data Acquisition System.

The interface between each WARP and its collocated ADAS will be via the LCN and will allow the WARP to acquire weather observation data from the ADAS in accordance with NAS-IR-25152508.

3.2.2.7 WARP to Area Control Facility.

The WARP will be installed at all sites in accordance with the facility requirements specified in NAS-IR-61002515.

3.2.3 Interfaces External to the NAS.

The WARP will have interfaces external to the NAS to the Traffic Management (TM) Coordinator, CWSU Meteorologist and the WARP Vendor in accordance with NAS-SS-1000 and to the directly connected WSR-88D radars in accordance with UNISYS 12083041 ICD.

3.3 REQUIRED OPERATIONAL CHARACTERISTICS.

Operationally, the WARP will be required to:

a. Generate and disseminate WSR-88D mosaics and real-time updates to the mosaic products to ACCC;

b. accept simultaneous and continuous receipt of a specified set of weather products;

c. process and store a specified set of weather products;

d. display radar, satellite, lightning, and/or graphic products for meteorologist use with graphic display capabilities;

e. produce or acquire selected meteorological analyses;

f. allow meteorologists to display, compose, and manipulate alphanumeric weather products for display at briefing positions;

g. allow meteorologists to create graphics and/or annotate existing graphics for display at briefing positions;

h. accept all weather products and exchange data with NAS subsystems as per NAS-IR-21012515, NAS-IR-61002515, NAS-IR-92020000, NAS-IR-51035101, NAS-IR-25152508, NAS-IR-25072515, NAS-IR-21020000, and the WARP to WARP ICD (TBD);

i. detect potential weather hazards in received data and provide prompt notification to the meteorologists;

j. generate and disseminate graphic and textual products for communicating hazardous weather conditions to ATC users;

k. provide interactive graphical weather displays for direct use by traffic coordinators, area supervisors, and other ATC users;

l. Maintain an ACF inherent availability of 0.9995.

3.4 REQUIRED TECHNICAL CHARACTERISTICS.

The WARP test verification program will verify full NAS-SS-1000 compliance of the WARP requirements and, in particular, the capability of WARP to:

a. generate and disseminate real-time updates to WSR-88D radar mosaic products to the ACCC within 30 seconds of receipt of an individual WSR-88D update;

b. disseminate individual WSR-88D radar products to neighboring WARP(s) within 5 seconds after receipt;

c. disseminate alphanumeric products to the ACCC and WMSCR within 10 seconds of generation/receipt;

d. generate and disseminate converted gridded binary products to ACCC within 5 minutes of receipt;

e. disseminate manually created graphic products to ACCC and WMSCR within 10 seconds of generation;

f. provide alphanumeric and graphic weather products generated by NWS, Department of Defense (DOD), and international agencies; as well as WSR-88D products, Federal Aviation Adminstration (FAA) products, and meteorological satellite imagery from domestic and foreign sources;

g. respond to data requests stored in its database and display them within 3 seconds mean time, 5 seconds 99 percent of the time, and within 10 seconds maximum time. Requests outside the database will be forwarded to the central storage location within 10 seconds after receipt of request;

h. acquire and maintain weather products for an area equal to the ARTCC/ACF area and national products;

i. produce or acquire and display station model plots, thermodynamic diagrams and sounding analysis, and plan view contoured analysis;

j. process, transfer and store weather products to the WARP and the WMSCR within 10 seconds of meteorologist request;

k. archive all products created that are generated or disseminated to external NAS subsystems for 15 days. WARP shall also maintain a journal of all products accepted for the last 15 days;

l. have data capacity to handle the data sources and destination with peak data rates;

m. disseminate products or requests to the WARP, WMSCR, ACCC, and vendors central storage location;

n. accumulate and maintain all data for the minimum retention time stated in NAS-SS-1000, volume II, paragraph 3.2.1.5.2.2.9;

o. display radar imagery, satellite imagery, or point format data at the resolution received; ACF radar mosaic at 4 kilometer (km); and national radar mosaic at 10 km;

p. overlay at least 3 products, display images in operator-selected colors from a palette of 256 colors and 64 gray scales, zoom displayed images in integer steps from 1:1 to at least 8:1 magnification, pan any zoomed product;

q. synchronize system time with external time source;

r. have an animation capability;

s. integrate properly within the NAS.

3.5 TEST AND EVALUATION STRATEGY.

For the purpose of FAA Test and Evaluation, WARP is characterized as an NDI-based acquisition with a development effort required to supply NAS interfaces and WSR-88D functionality. The WARP test and evaluation process addressed in this TEMP is based on FAA NAS Test and Evaluation Policy, FAA Order 1810.4B and FAA Order 1810.6 for NDIs. Test strategies for each test and evaluation phase are summarized in the following sections. The WARP test flow diagram in appendix C identifies the overall approach for testing the WARP system.

The acquisition strategy for WARP stages 1 and 2 requires acquisition and deployment of three versions of the WARP system (stage 1a to provide WSR-88D radar mosaics to the ACCC, stage 1b to provide an NDI weather analysis capability and interfaces to WMSCR, ADAS, CTS,and MPS NAS subsystems; and stage 2 to provide full WSR-88D functionality). Operational Capability Demonstrations (OCD) will be held at each offeror's facility as part of the technical evaluation of the proposal for contract award. Based on the WARP acquisition strategy, FAA T&E of the WARP system will require full Development Test and Evaluation (DT&E) and Operational Test and Evaluation (OT&E) for stage 1a and 1b prior to a Deployment Readiness Review (DRR) decision required for deployment. WARP stage 2 will be a new software release which will require a full DT&E phase with a follow-on OT&E phase prior to updating the deployed stage 1 WARP system(s). WARP Stage 2 will not require a DRR decision.

WARP stage 1b will be acquired, tested, and deployed prior to stage 1a. WARP stage 1b will be tested to verify those WARP specification paragraphs listed in section J-4, WARP Staged Requirements Traceability Matrix, of the WARP RFP for stage 1b. Testing of WARP stages 1a and 2 will address those WARP specification requirements listed in section J-4 of the WARP RFP for the respective stages.

Four limited production WARP systems will be procured to support the WARP testing effort. The four limited production systems will consist of two systems for OT&E (one to test the ARTCC/ACF requirements and one to test the ATCSCC requirements), one for the first ARTCC/ACF site and one for development at the contractor's facility. The WARP OT&E program will require two key sites. The two key sites will be the ATCSCC and an ARTCC/ACF. Two key sites are necessary due to differences in WARP requirements for the ATCSCC and the ARTCC/ACFs. The ACF WARP and ATCSCC WARP requirements will be tested independently, and possibly concurrently. WARP OT&E of the ACF requirements will be tested at the FAA Technical Center. WARP OT&E of the ATCSCC requirements will be tested at the FAA Technical Center, or at the ATCSCC. Following DRR approval, WARP systems will be acquired for the remaining ARTCC/ACFs and one for the FAA academy for training. Testing resources for WARP DT&E and OT&E are defined in table 1 of appendix B. Funding for FAA Technical Center contractor personnel will be addressed in the yearly Program Directives between ANW-200 and ACW-200B.

3.5.1 OCD Strategy.

As part of the WARP solicitation process, an OCD will be conducted by prospective WARP offerors prior to contract award. The OCDs will demonstrate the current functionality of the offerors' proposed NDI-based systems. The OCDs will be used by the FAA to evaluate the ability of the offeror's proposed system to meet a subset of the WARP system specification requirements (FAA-E-TBD) and to assess the risk to the government of building the WARP system on the offeror's NDI platform. At the conclusion of the solicitation process, a contractor will be selected to provide the WARP service.

The WARP Associate Program Manager for Engineering (APME), ANW-600, will organize a technical evaluation team comprised of FAA and support contractor personnel with sufficient expertise and experience to participate in the evaluations of each prospective vendor's OCD. The WARP APME will be responsible for overall management and scheduling for the OCDs.

3.5.2 Development Test and Evaluation (DT&E) Strategy.

The chosen WARP contractor shall modify its proposed NDI-based system to implement interfaces that will allow the WARP to communicate and exchange data with other NAS subsystems and to provide the WSR-88D functionality required to supply real-time weather radar data to the air traffic controllers. The DT&E is intended to verify that the developed interfaces are correctly implemented according to applicable IRDs, using simulated NAS interfaces where required, that the developed/modified NAS interface software has been correctly integrated with the NDI capabilities at OCD, and the WARP system meets all physical, functional, and performance requirements of the WARP Specification.

For each stage of the WARP acquisition, the contractor shall plan and conduct a DT&E Factory Acceptance Test (FAT) of the WARP limited production systems. The DT&E FAT will be formally witnessed by the FAA. The DT&E FAT shall verify the capability of WARP to meet all functional, interface, and performance requirements of FAA-E-TBD as delineated for each stage (1a, 1b, and 2) in section J-4 of the WARP RFP.

Stage 1b will be tested first with the following stages (1a and 2) tested for their WARP specification requirements and also regression tested for any impact to the delivered capabilities of the preceding stage(s).

The contractor shall plan and conduct a DT&E Site Acceptance Test (SAT) of the two WARP systems which will support OT&E. The DT&E SAT will occur at the FAA Technical Center and the first operational site and shall be formally witnessed by the FAA. The DT&E SAT shall verify the capability of WARP to meet functional, interface, and performance requirements of FAA-E-TBD.

3.5.3 Operational Testing and Evaluation (OT&E) Strategy.

The FAA will conduct OT&E to evaluate WARP NAS end-to-end baseline performance, operational effectiveness and suitability, including reliability, availability, degraded operations, stress and NAS loading, human factors, safety, maintainability, site-adaptation data, security, and transition switchover. OT&E also identifies deficiencies in NAS hardware, software, human performance factors, and/or operational concepts. It encompasses an interactive process of risk reduction demonstrations and analysis and assures that the NAS functionality (as it existed prior to installation of a new subsystem) is not degraded. OT&E consists of three test phases - Integration, Operational, and Shakedown. The division of responsibilities for FAA OT&E (Integration, Operational, Shakedown) as per FAA Order 1810.4B are illustrated in figure 3.5.3-1. Successful completion of WARP OT&E for stages 1a and 1b will result in a DRR Executive Committee (EXCOM) decision to deploy the contractor system for both versions of stage 1 WARP. WARP stage 2 OT&E testing will also occur at the FAA Technical Center. The contractor shall provide the WARP stage 2 software to the FAA Technical Center after successful DT&E is completed. When a successful OT&E is completed on the stage 2 software, a deployment recommendation will be made to ANW-600 by ACW-200B. The following NAS interfaces will be tested as part of the stage 1b requirement: WMSCR, ADAS, CTS, and MPS. The ACCC NAS interface will be tested as part of the stage 1a requirement. All NAS subsystems planned for integration with WARP are scheduled to be available in time for WARP OT&E testing at the FAA Technical Center. Interfaces that are not available for OT&E at the FAA Technical Center will have to be tested using follow-on site testing at an operational site when the interfaces become available. Responsibility for testing of the WARP NAS interfaces, when they become available, will be discussed and agreed upon by the WARP program office and the respective WARP NAS interfacing subsystem program office.

During OT&E operational and shakedown testing, personnel from air traffic, airways facilities (AF), and CWSU meteorological community will participate in assessing the operational suitability and effectiveness of the WARP system.

3.5.4 Production Acceptance Test and Evaluation (PAT&E) Strategy.

The contractor shall prepare and conduct a PAT&E SAT of the WARP system at each operational site after installation of WARP. The PAT&E SAT shall verify the capability of the WARP system to meet functional, interface, and performance requirements of FAA-E-TBD. During the SAT conduct, live NAS interfaces shall be used, if available.

3.6 CRITICAL TEST AND EVALUATION ISSUES.

The verification philosophy used on the WARP is based on a building-block approach. All functional and performance requirements delineated in FAA-E-TBD and the NAS IRDs will be verified through Test, Demonstration, Analysis, or Inspection. The WARP OT&E test approach will be guided by the Open Systems Interconnection (OSI)/International Organization for Standardization (ISO) 7498 OSI Model, where applicable.

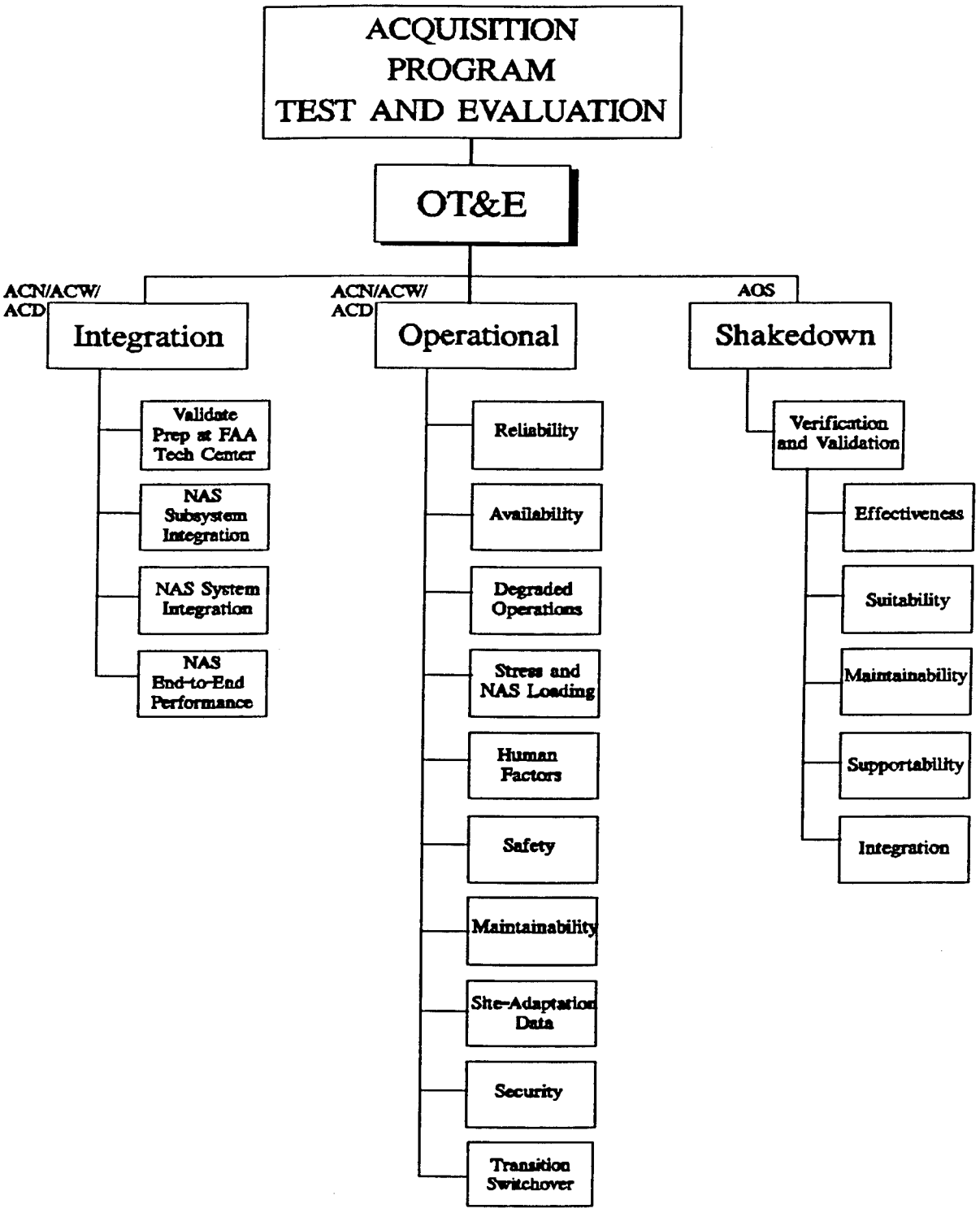

FIGURE 3.5.3-1. FAA OT&E INTEGRATION/OPERATIONAL/SHAKEDOWN ILLUSTRATED RESPONSIBILITIES

3.6.1 Technical Issues.

The following are critical technical issues associated with the WARP testing program:

a. Testable requirements for the WSR-88D radar interfaces and the WARP to WARP interfaces need to be identified and published in ICDs;

b. If the WARP system uses the FAA Telecommunications Satellite (FAATSAT) for communication between ARTCCs, testable requirements for the FAATSAT interface need to be identified and published in government document(s) for DT&E and OT&E testing;

c. If commercial satellite communication is accepted as a viable implementation for WARP, WARP DT&E and OT&E testing will require Reliability, Maintainability, and Availability (RMA) test requirements for the vendor's satellite communication system. These requirements will include a bit error rate test and Reliability, Maintainability, and Availability (RMA) analysis of the impact of the commercial system on the WARP availability requirements;

d. Testing of ATCSCC WARP requirements will depend on the contractor designed WARP system configuration.

e. Testing the WARP to WARP interface cannot be completed without all WARPs being deployed to verify the interface between a given WARP and its neighbor WARP(s) to provide ACF WSR-88D mosaicking capabilities.

f. The inherent availability number for the WARP system is specified as 0.99963, to maintain an overall NAS system 0.9995 availability, in the WARP specification and as 0.9995 in the NAS. The 2190 hours MTBF (NAS) and 2190 hours MTBCF (WARP Specification) when combined with a MTTR of .5 hours (NAS and WARP Specification) produce an inherent availability requirement of 0.999772. For WARP to meet the NAS requirement for 2190 MTBF, the WARP will have to maintain an inherent availability of at least 0.999772.

g. If different communication requirements for the Anchorage, AK, ACF are needed, they will be addressed in the OT&E Plan(s) and Procedures.

3.6.2 Operational Issues.

An operational site needs to be determined to support the OT&E effort. A WARP to WARP interface test using the WARP system at the designated operational site and the WARP system at the FAA Technical Center as neighboring ARTCCs must be performed.

3.7 QUALITY ASSURANCE.

The testing delineated in this TEMP will be performed in accordance with the quality assurance requirements of the WARP Request for Proposal (RFP). FAA-STD-013b and FAA-STD-018 are the applicable FAA Quality Assurance Standards.

4. PROGRAM SUMMARY.

4.1 ORGANIZATIONAL RESPONSIBILITIES.

Organization	Primary Roles and Functions
ANW-200	The WARP Program Manager (PM) directs and manages all FAA activities for WARP acquisition and implementation. The PM is responsible for design, development, integrated logistic support, test and evaluation, full-scale production, and installation. The PM is the spokesperson for the project inside and outside the FAA, including Congress, other government agencies, contractors, the aviation community, and the media. The PM develops the acquisition plan and project implementation plan. The PM develops program and budget justification documentation and controls program funds within approved appropriation. The Program Manager and the Associate Program Manager for Test (APMT) jointly prepare and approve a Program Directive (PD). The ANW-200/ACW-200B PD delineates activities to be performed by both organizations and the required funding and resources required by those activities. The PM also jointly prepares PDs with other Associate Program Managers (APMs) in the matrix team which delineates activities outside of funding.
ANW-600	The WARP APME directs, manages, and accomplishes engineering activities delineated in PM/APME program directives. The APME selects the FAA technical evaluation team to witness OCDs. The APME provides assistance and support to the implementation of this TEMP through the review of related test plans, procedures, test data, and test reports. In conjunction with the ACW-200B APMT, the APME presents reviews to the Test Policy Review Committee (TPRC) as required.
ASU-420	The WARP Associate Program Manager for Quality (APMQ) directs, manages, and accomplishes quality activities delineated in WARP program directives.
ANS-420	The WARP Associate Program Manager for Logistics (APML) directs, manages, and accomplishes logistics and training activities delineated in WARP program directives.
ACW-200B	The WARP APMT is the focal point for testing activity. The APMT ensures the preparation of test plans and procedures is in accordance with FAA-STD-024a. Responsibility for all aspects of DT&E, OT&E Integration and OT&E Operational testing are the APMT's and is in accordance with FAA Order 1810.4B and ANW-1 directives. The APMT conducts Test Schedule Status Review (TSSR) meetings and provides recommendations based on test results in support of the DRR EXCOM process. ACW-200B may utilize contractor support, where needed, to meet these requirements.

AOS-530	AOS-530 is responsible for the development and preparation of the WARP OT&E Shakedown Test Plan, WARP OT&E Shakedown Test Procedures, and will conduct OT&E Shakedown testing. OT&E Shakedown testing is, in part, an Independent Validation & Verification of the OT&E Operational effort. AOS-530 will witness OT&E Integration and OT&E Operational testing. Requirements that have been demonstrated to AOS-530's satisfaction during OT&E Integration and OT&E Operational testing will not be retested during OT&E Shakedown. AOS-530 will review the technical instruction books for completeness and technical accuracy.
ASE-100	ASE-100 will validate WARP system requirements and generate the NCPs required for all new NAS interfaces for the WARP system.
ATR-130	ATR-130 is responsible for developing WARP system requirements which are validated by ASE-100. ATR-130 will ensure Air Traffic (AT) satisfaction with the WARP program throughout the WARP acquisition cycle.
Prime WARP Development Contractor	Conducts development, factory, site acceptance, and production testing. Provides test support to FAA OT&E testing as requested. Works deficiencies related to testing.
FAA Regions	Support activities described in the WARP Program Implementation Plan which lead to site acceptance and field shakedown testing.
TPRC	Responsible for approving TEMPs and their revisions, and resolving T&E issues that cannot be resolved at lower levels of management.

4.2 SPECIFIC RESPONSIBILITIES.

The following provides specific responsibilities and authorities consistent with FAA Order 1810.4B.

4.2.1 Program Manager (PM)/Associated Program Manager for Engineering (APME).

a. Responsible for overall program management.

b. Presents T&E deployment issues to DRR.

c. Arranges with APMT for T&E support, coordination and monitoring through an annual PD.

d. Approves PD.

e. Tasks APMT to prepare PDs between the program office and other FAA organizations.

f. Requests funding for project T&E which is included in the overall program funding.

g. Responsible for receiving TPRC approval for the FAA TEMP.

h. Prepares test policy waiver requests, and submits them to the Secretariat via the Service Director or Program Director, as appropriate.

i. Coordinates T&E requirements for DOD, or other government agencies, on joint procurements as the project requires.

j. Develops, or has the APMT develop, the project specification VRTM, and incorporates these requirements into the project.

k. With APMT support, brings unresolved T&E issues before the TPRC via the TPRC Secretariat.

l. Approves DT&E test plans, procedures, and reports.

m. Recommends to the contract officer (CO) approval of DT&E test plans, procedures, and reports.

n. Reviews DT&E test plans, procedures, and reports.

o. Monitors DT&E contractor conducted tests.

p. Reviews OT&E Integration and OT&E Operational test requirements, plans, procedures, and reports.

q. Approves OT&E Integration and OT&E Operational test requirements, plan, procedures, and reports.

r. Monitors OT&E Integration and OT&E Operational tests.

s. Monitors OT&E Shakedown.

t. Reviews Field Shakedown requirements with the Airway Facilities Division organization.

u. Reviews SAT test plans, procedures, and reports.

v. Monitors Field Shakedown.

w. Oversees distribution for DT&E/SAT test plans, procedures, and reports.

x. Responsible for FAA TEMP distribution.

y. Responsible for identifying and prescribing appropriate distribution and accountability controls for program technology that is critical to the United States, in accordance with applicable provisions of National Security Directive 298 and the Industrial Security Manual.

4.2.2 Engineering, Test, and Evaluation Service (ACN)/Engineering, Integration and Operational Evaluation Service (ACW).

ACW responsibilities:

a. Member of the TPRC.

b. Provides APMT.

c. Prepares Project TEMP.

d. Prepares OCD plans/procedures.

e. Reviews test plans.

f. Reviews DT&E, OT&E Integration and OT&E Operational test requirements.

g. Provides concurrence on OT&E Integration and OT&E Operational test plans and reports prior to review.

h. Presents unresolved T&E issues, significant T&E test result problems, or violations of T&E policy to the TPRC.

i. Provides T&E assessments to the DRR.

ACN responsibilities:

a. Member of TPRC.
b. Provides for FAA Technical Center facility readiness.

4.2.3 APMT.

a. Supports development of test policy and test standards.

b. Acts as the agent of the PM to manage the T&E program; including establishing overall test schedules, coordinating tests, ensuring that all test requirements are satisfied, and that tests are performed in accordance with approved procedures.

c. Prepares, coordinates, and approves, with the PM, an annual PD which addresses all T&E task support activities and resources required for the project.

d. Prepares appropriate T&E inputs to project document (e.g., project procurement package) and as specifically tasked in the PD.

e. Prepares PDs between the project office and other FAA or DOD organizations to fund and/or arrange for the organizations' participation in T&E activities.

f. Jointly prepares and updates the FAA TEMP with the PM.

g. Provides updates of available test results during DRR.

h. Reviews DT&E test requirements, plans, procedures, and reports.

i. Arranges DT&E and PAT&E test support.

j. Prepares DT&E and PAT&E test requirements.

k. Coordinates with performing organizations, and monitors DT&E, OT&E, and PAT&E activities.

l. Reviews contractor-prepared DT&E and PAT&E plans, procedures, and reports.

m. Prepares DT&E and PAT&E test plans, procedures, and reports when tasked by the PM to develop hardware or software, instead of a contractor.

n. Directs and conducts DT&E testing if tasked by the PM/APME and monitors DT&E testing performed by a contractor.

o. Reviews DT&E and PAT&E requirements for inclusion in the FAA TEMP.

p. Prepares OT&E Integration and OT&E Operational test requirements for inclusion in the FAA TEMP.

q. Prepares OT&E Integration and OT&E Operational test plans, procedures, and reports.

r. Reviews OT&E Shakedown requirements, plans, and procedures.

s. Directs and conducts OT&E Integration and OT&E Operational tests. AOS-530 may optionally participate in test conduct.

t. Reviews all OT&E Shakedown reports (information only).

u. Reviews Field Shakedown requirements, plans, procedures, and reports.

v. Monitors OT&E Shakedown.

w. Monitors Field Shakedown.

4.2.4 Office of Independent Operational Test & Evaluation Oversight (ATQ).

a. Member of TPRC.

b. Oversees all WARP testing effort.

c. Assesses operational suitability and effectiveness of the WARP system.

d. Coapproves the TEMP.

e. Reviews and comments on DT&E and OT&E plans, procedures, and reports.

f. Provides operational readiness assessment reports to the FAA Administrator.

4.2.5 Operational Support Service (AOS).

a. Member of TPRC.

b. Identifies and develops with the PM and APMT, OT&E Shakedown requirements for inclusion in the FAA TEMP.

c. Optionally supplies draft PD, reviews and approves final PD.

d. Reviews FAA TEMP.

e. Reviews OT&E Integration and OT&E Operational test requirements, plans, and reports.

f. Monitors DT&E tests.

g. Monitors OT&E Integration and OT&E Operational tests, and optionally participates in OT&E Integration and OT&E Operational test conduct.

h. Prepares OT&E Shakedown requirements, plans, procedures, and reports in coordination with ATR.

i. Approves, in coordination with Air Traffic Plans and Requirements Service (ATR), additional OT&E Shakedown requirements that do not exceed OT&E Shakedown durations or costs as baselined in the TEMP.

j. Approves OT&E Shakedown plans, procedures, and reports.

k. Directs and conducts OT&E Shakedown as applicable to OT&E requirements. ATR will support and participate in those tests that are applicable to ATR OT&E Shakedown requirements.

l. Provides personnel for performing and/or monitoring the conduct of OT&E Shakedown.

m. Conducts OT&E Shakedown data analysis.

n. Provides a deployment recommendation based on OT&E Shakedown results in support of the DRR.

o. Monitors, and optionally participates, in test conduct of Field Shakedown.

4.2.6 Air Traffic Plans and Requirements (ATR).

a. Member of TPRC.

b. Provides requirements for and reviews the FAA TEMP.

c. Provides operational expertise and planning for conducting and analyzing tests.

d. Reviews DT&E, OT&E, and PAT&E requirements.

e. Provides personnel to support monitoring and conduct of DT&E.

f. Reviews program PDs.

g. Provides test requirements (via the FAA TEMP), supports test plan development, and reviews test plans and procedures for OT&E Integration and OT&E Operational tests.

h. Provides and approves additional test requirements (that do not exceed OT&E Shakedown durations or costs as baselined in the FAA TEMP) not identified in the TPRC-baselined FAA TEMP for OT&E Integration and OT&E Operational tests. When change or additions are required which exceed cost or schedule allotments previously planned, the normal process for adjusting the planned testing and resolving disagreements applies.

i. Determines the operational acceptability of new ATC operational computer programs or systems prior to their delivery for operational testing and use in field facilities.

j. Provides personnel for conducting and/or monitoring the conduct of OT&E Integration and OT&E Operational tests.

k. Reviews OT&E Integration and OT&E Operational test reports.

l. Provides and coordinates test requirements, supports test plan development, and reviews test plans and procedures for OT&E Shakedown.

m. Provides personnel for conducting and/or monitoring the conduct of OT&E Shakedown.

n. Reviews OT&E Shakedown reports.

o. Provides and reviews requirements, plans, and procedures for Field Shakedown.

p. Monitors the conduct of Field Shakedown.

q. Reviews Field Shakedown reports.

r. Provides a deployment recommendation based on OT&E Shakedown results, in support of the DRR.

4.2.7 Office of Air Traffic System Management (ATM).

a. Reviews Field Shakedown requirements, plans, procedures, and reports.

b. Determines the operational acceptability of new ATC operational computer programs or systems prior to their delivery for operational testing and use in field facilities.

c. Monitors OT&E Operational testing.

d. Monitors Field Shakedown.

e. Monitors computer program implementation schedules to ensure operational requirements are met.

f. Manages requirements for new airspace management systems.

g. Reviews PDs via ATR.

4.2.8 Air Traffic Rules and Procedures Service (ATP).

a. Reviews Field Shakedown requirements, plans, procedures, and reports.
b. Monitors Field Shakedown.
c. Develops procedures for system implementation.
d. Reviews PDs via ATR.

4.2.9 Associate Administrator for Contracting and Quality Assurance.

a. Member of TPRC.

b. Reviews PDs and approves PDs.

c. Reviews FAA TEMP and contractor's TEMP.

d. Reviews DT&E and PAT&E test plans, procedures, and reports.

e. Verifies completeness of program by reviewing the final OT&E Integration and OT&E Operational testing, OT&E Shakedown and Field Shakedown report from each site.

4.2.10 FAA Contracting Officer.

a. Approves DT&E and PAT&E test plans, procedures, and reports for contractual compliance.

b. Ensures DT&E tests are conducted per contract.

4.2.11 Contracting Officer's Technical Representative (COTR).

a. Reviews DT&E test plans, procedures, and reports.

4.2.12 Quality Reliability Officer (QRO).

a. Monitors DT&E tests.

4.2.13 Regional Airway Facilities Division.

a. Supports PM in development of test requirements for inclusion in FAA TEMP.

b. Supports PM in implementation of FAA TEMP at test and operational facilities.

c. Responsible for overall Field Shakedown, in cooperation with Air Traffic Division.

d. Coapproves, jointly with Air Traffic Division, Field Shakedown requirements with the PM.

e. Approves Field Shakedown plans, procedures, and reports.

f. Participates in the conduct of OT&E Integration and OT&E Operational testing, and OT&E Shakedown, as coordinated with AOS.

g. Directs Field Shakedown that is in satisfaction of Airway Facility Division test requirements or objectives, and as coordinated with Air Traffic Division.

h. Conducts Field Shakedown in coordination with Air Traffic Division. AOS-530 has the option of participating in test conduct.

4.2.14 Airway Facilities Sectors.

a. Participates in FAA TEMP activities as required by Airway Facilities Division.

b. Develops Field Shakedown requirements, plans, and procedures in coordination with facility AT organization.

c. Conducts Field Shakedown, including Joint Acceptance Inspection (JAI), and reports results in coordination with facility AT organization.

4.2.15 Regional Air Traffic Division.

a. Support PM via ATR in development of test requirements for inclusion in the FAA TEMP.

b. Supports PM in implementation of FAA TEMP at test and operational facilities, as required by ATR.

c. Supports Airway Facilities Division in the development of Field Shakedown requirements, plans, procedures, and reports with the inclusion of Regional Air Traffic Division objectives and interests.

d. Provides coordination to Airway Facilities Division for Field Shakedown requirements, plans, procedures, and reports.

e. Participates in the conduct of OT&E Integration and OT&E Operational testing, and OT&E Shakedown, as coordinated with the ATR organization.

f. Supports Field Shakedown that is in satisfaction of Regional Air Traffic Division test requirements or objectives, as coordinated with Airway Facilities Division.

g. Conducts Field Shakedown in coordination with Airway Facilities Division.

h. Monitors Field Shakedown.

i. Reviews PD via ATR.

4.2.16 Air Traffic Facilities.

a. Participates in FAA TEMP activities as required by ATR through Regional Air Traffic Division.

b. Supports development of Field Shakedown requirements, plans, procedures, and reports in coordination with facility Airway Facilities organizations.

c. Conducts and monitors Field Shakedown and reports results in coordination with facility Airway Facilities organizations and Regional Air Traffic Division.

d. Reviews PD via ATR and Regional Air Traffic Division.

4.2.17 System Engineering Configuration Control Board (SECCB).

a. Approves test standards and definitions.
b. Approves NAS-SS-1000 NCPs and IRDs that affect system requirements.

4.2.18 NAS Configuration Control Board (AND/ASD/AAF/CCB).

a. Approves DT&E and PAT&E requirements contained in the project specification (e.g., project specification VRTM).

4.2.19 Test Policy Review Committee (TPRC).

a. Supports T&E policy, test standards, and definitions.

b. Approves TPRC operating procedures.

c. Approves FAA TEMP and revisions.

d. Approves test policy waivers.

e. Resolves disagreements on T&E issues when agreements cannot be reached at lower levels of FAA management.

4.2.20 Associate Administrator for System Engineering and Development (ASD).

a. Provides Program Manager (via the Research and Development Service (ARD)).

b. Appoints Chairperson of the TPRC.

c. Chairperson assumes responsibility of making final decisions on actions brought before the TPRC.

4.2.21 NAS System Engineering Service (ASE).

a. Reviews FAA TEMP.

b. Provides the NAS-SS-1000 System Specification requirements for inclusion in the FAA TEMP VRTM, or coordinates requirements for those projects not included in the NAS-SS-1000.

4.2.22 Engineering Specialties and Configuration Management Division (ASE-600).

a. Serves as TPRC Secretariat.

b. Formulates revisions to test policy, test standards and definitions for consideration and endorsement by the TPRC.

c. Verifies compliance with FAA Order 1810.4B and standards.

d. Develops and maintains the TPRC Operating Procedures.

e. Provides and maintains implementation traceability for NAS Verification via the VRTMs contained in the NAS-SS-1000 System Specification.

f. Develops VRTMs for new NAS-SS-1000 System Specification projects and NAS IRDs.

4.2.23 NAS Transition and Implementation Service (ANS).

a. Member of TPRC.

b. Provides supportability requirements to the APMT for inclusion in the FAA TEMP, which serves as guidance to AOS for the OT&E plans.

c. Reviews FAA TEMPs.

d. Reviews requirements, plans, and procedures for OT&E plans.

e. Provides personnel for conducting and/or monitoring the conduct of OT&E Shakedown.

f. Reviews OT&E Shakedown reports.

g. Reviews PDs.

h. Approves PDs.

4.2.24 NAS Development Special Assistant (AND-3).

a. Member of TPRC.

b. Reviews FAA TEMP.

c. Supports development of revision to test policy, test standards, and definitions.

4.3 INTEGRATED SCHEDULE AND TEST FLOW DIAGRAM.

Appendix B presents the WARP Program Master Baseline Schedule (PMBS). The WARP Test Flow Diagram can be found in appendix C.

4.4 TEST PLANS.

4.4.1 FAA Test Plans.

4.4.1.1 FAA Test and Evaluation Master Plan.

This TEMP is developed in accordance with FAA-STD-024a and FAA Order 1810.4B. The purpose of this TEMP is to delineate the overall process for conducting the WARP test and evaluation program. The TEMP identifies verification methods for contractor, OT&E Integration, OT&E Operational, and OT&E Shakedown testing. Correlation between the Operational Requirements Document (ORD), IRDs, WARP system specification, and validated NAS requirements will be included in the TEMP as these documents are updated.

4.4.1.2 FAA OCD Plan.

The APMT has the overall responsibility for developing the OCD Plan. The OCD Plan will describe resources and activities required to take place during the OCDs at the offerors' facilities. It will identify the capabilities to be demonstrated; OCD conduct and organizational responsibilities.

4.4.1.3 FAA OT&E Integration and OT&E Operational Test Plan.

The APMT has the overall responsibility for developing the OT&E Integration and OT&E Operational Test Plan in accordance with FAA-STD-024a and FAA Order 1810.4B. The tests addressed in this plan will be of a quantitative and qualitative nature, and are deemed successful if the results meet ORD, FAA-E-TBD and NAS-SS-1000 qualification requirements. Included are tests that verify the operation of multiple interfaces and integration with other systems in the operational environment.

4.4.1.4 FAA OT&E Shakedown Test and Evaluation Plan.

AOS-530 will develop the OT&E Shakedown Test and Evaluation test plan. The plan will focus on WARP operational useability and maintainability and be designed to provide an assessment of how well the system will integrate into the up-to-date real-world NAS environment. As the final phase of OT&E testing, it will focus on system operation and maintenance as performed by typical system operators and maintenance personnel when they must rely on typical training, documentation, procedures, logistics support, and system user friendliness. This final block in the OT&E test program determines to what degree the system will meet its mission when operated and maintained by the people who will receive and use it.

4.4.2 Contractor Developed Test Plans.

4.4.2.1 Contractor Master Test Plan.

The WARP contractor shall develop a Contractor Master Test Plan (CMTP) to verify the WARP meets the requirements specified in FAA-E-TBD. The CMTP will show traceability to the project specification VRTM and identifies the allocation of test requirements to subsequent test plans and procedures. Once the FAA approves the contractor's Test Plan, it will become a test control document. The CMTP will include (1) a schedule of testing, (2) objectives for the test phase, and (3) responsibilities and resources needed to support the test program. The CMTP will

include a specification compliance matrix and indicate specification paragraph, methodology, and verification level for each requirement. The CMTP will clearly delineate that every physical, performance, functional, and operational requirement contained in FAA-E-TBD is verified in DT&E FAT and/or DT&E SAT.

4.4.2.2 Contractor System Integration Plan (SIP).

The WARP contractor shall develop this plan to demonstrate how the WARP will integrate and test the various components of the WARP system. This plan will describe all plans and activities for developing and testing each stage of the WARP and demonstrating that the system performance of the previous stage, if any, has not been degraded. Tests addressed in this plan shall be of sufficient detail to ensure the government requirements of FAA-E-TBD, the contract SOW, and other documents referenced therein are met.

4.4.2.3 Contractor FAT Plans.

The contractor shall provide a DT&E FAT Plan and a PAT&E FAT Plan. The DT&E FAT plan shall describe the methodology for testing and accepting the WARP system at the contractor factory facility. The DT&E FAT Plan shall define the range of tests, system initialization requirements, input data, expected output, and criteria to provide assurance the system is ready for testing in an operational environment. Testing resources such as equipment, facilities, and schedules shall also be identified.

System performance testing for the DT&E FAT shall be performed to ensure the first and each subsequent system is ready to be sent to a field site and shall include testing performed under:

a. Normal data flow and operational conditions, including peak data flow conditions;

b. Limit and overload of system inputs, processing, outputs, and storage;

c. Erroneous data input;

d. Failure and recovery conditions.

The PAT&E FAT plan shall define a range of tests necessary to verify the production systems conform to FAA-E-TBD, are free of defects, and are identical to the limited production WARP systems.

4.4.2.4 Contractor SAT Plan.

The contractor shall provide a SAT plan which shall address requirements for both DT&E SAT and PAT&E SAT. The plan shall describe the methodology for testing and accepting the limited production equipment for OT&E and production equipment at each site. This plan shall be provided for government approval before the first site installation. The SAT Plan defines the range of tests, system initialization requirements, input data, expected output, and criteria for evaluating test results. Testing resources such as personnel, equipment, facilities, and schedules are also identified.

System performance testing for the SAT shall be performed under:

a. Normal data flow and operational conditions, including peak data flow conditions;

b. Limit and overload of system inputs, processing, outputs, and storage;

c. Erroneous data input;

d. Failure and recovery conditions.

4.4.2.5 Contractor Quality Control Program Plan (QCPP).

The contractor shall develop this plan to display how system quality checks will be performed during system preparation/development. This plan will ensure all system quality requirements of FAA-E-TBD are met.

5. OPERATIONAL CAPABILITIES DEMONSTRATION.

This section describes the events, scope of demonstration, and basic scenarios planned for the OCD of each vendor. Each prospective vendor will demonstrate that their system is in compliance with an FAA selected subset of the requirements of FAA-E-TBD. OCD is conducted at the contractors' facilities and encompasses NDI hardware and software demonstration.

Each offeror will receive generic demonstration procedures and test cases. Using this material, each offeror shall prepare detailed OCD procedures. These detailed procedures shall specify the step-by-step actions required to conduct the OCD. At the time of the OCD, the FAA will choose the actual products/data to be used in support of the OCD procedures. Each contractor is responsible for timely and satisfactory completion of the OCD in accordance with the OCD schedule.

The OCDs will be witnessed by an FAA Technical Evaluation Team formed by the WARP APME. This team will issue an OCD evaluation report for each offeror's OCD and summarize the results of the OCD. This report will be used by the FAA in the technical proposal evaluation process and will not be available to the offerors.

The following demonstration categories will be addressed at each OCD which will verify the following major WARP System functional areas:

a. Radar Products;
b. Satellite Products;
c. Lightning Products;
d. Alphanumeric Products;
e. NWS Graphic/Gridded Products;
f. Weather Data Analyses Products;
g. Alarm/Alert Capabilities;
h. WARP Monitoring & Control Capabilities;
i. Computer-Human Interface;
j. Retention;

k. Archiving;
l. Concurrent Processing;
m. Adaptive Operation Requirements;
n. System Characteristics.

5.1 OCD TO DATE.

No OCD has been started on the WARP to date.

5.2 FUTURE OCD.

5.2.1 OCD Procedures.

OCD procedures will be developed to ensure the proposed system demonstrates general functionality with FAA-E-TBD requirements, excluding NAS interface and WSR-88D functionality requirements. The FAA will develop generic OCD procedures and the offeror(s) will develop detailed procedures in accordance with the generic procedures. A suggested guideline for the format of the detailed procedures is FAA-STD-024a. Each procedure should include the following components:

a. Description/Objective;
b. Critical Issues;
c. Setup;
d. Method;
e. Expected Results.

Detailed plans/procedures for each demonstrated requirement and/or demonstration objective must include a demonstration methodology, demonstration configuration, and manning requirements.

The offeror(s) will develop and provide specific procedures for each activity identified in the generic OCD procedures. The procedures will describe the step-by-step approach for satisfying the requirement(s), including personnel, equipment, schedule, location, etc.

5.3 OCD EVENTS/SCOPE OF DEMONSTRATION/BASIC SCENARIOS.

OCD of the vendor proposed NDI-based systems will be accomplished at the offeror(s)' facilities.

5.4 CRITICAL OCD ITEMS.

There are several critical items associated with the OCD. Coordination with FAA/NWS sites and personnel for collection of comparison data must be performed. It must be determined whether or not the MWP will be used as a basis of comparison for some OCD procedure steps.

6. DT&E.

DT&E is comprised of two stages: DT&E FAT and DT&E SAT. DT&E is intended to verify the developed interfaces are correctly implemented according to applicable Interface Requirement Documents (IRDs), the developed/modified NAS interface software has been correctly integrated with the NDI system, the NDI requirements of the WARP specification are met, and the required WSR-88D functionality is correctly implemented. ACW-200B will be responsible for all aspects of the WARP DT&E testing cycle.

Prior to DT&E testing of the WARP NAS interfaces that utilize NADIN II, the contractor shall allow the FAA to access the WARP system remotely to conduct NADIN Packet Switch Network (PSN) conformance testing. The testing will be performed in accordance with a conformance process developed by the FAA Technical Center and shall require the contractor to connect their system to the FAA Technical Center via leased line. The contractor shall provide the FAA with at least 1 month's notice prior to having the FAA conduct the NADIN PSN conformance testing on the WARP. The contractor shall coordinate scheduling of the conformance testing with the FAA and shall provide technical support as required to:

a. ensure successful WARP access;

b. support collection of any WARP data required for conformance verification;

c. provide necessary fixes to WARP software for any conformance test problems encountered.

Once conformance testing is successfully completed by the FAA, the contractor shall baseline the communication software used for the NADIN PSN interface. This will ensure proper configuration management of the tested software for future testing.

As part of the DT&E effort, the contractor shall plan and conduct a DT&E FAT of the WARP which shall be formally witnessed by the FAA. The DT&E FAT shall verify the capability of WARP to meet all functional, interface, and performance requirements of FAA-E-TBD. DT&E FAT is conducted at the contractor's facility and encompasses hardware, software, system testing, and test reports. DT&E FAT shall be conducted by the contractor using FAA approved, contractor developed test plans, and procedures. The contractor is responsible for timely and satisfactory completion of testing in accordance with the WARP schedule.

The contractor shall utilize simulators during DT&E FAT to verify the NAS interface requirements of the WARP system for those NAS subsystem interfaces which are not available to the WARP in the FAT environment. Simulators used for FAT testing will be approved by the FAA.

The contractor shall also plan and conduct a DT&E SAT of the two WARP systems which will support OT&E. The DT&E SAT will occur at the FAA Technical Center and the first operational site and shall be formally witnessed by the FAA. The SAT shall verify the capability of WARP to meet functional, interface, and performance requirements of FAA-E-TBD. DT&E SAT shall consist of a subset of the DT&E testing requirements to ensure the contractor maintains a baselined system. The CMTP shall describe methodology for testing FAA-E-TBD system requirements during DT&E FAT and DT&E SAT.

6.1 DT&E TO DATE.

No DT&E has started on the WARP to date.

6.2 FUTURE DT&E.

6.2.1 Contractor's Test Procedures.

The contractor shall develop and provide test procedures for each physical, functional, and performance requirement identified in FAA-E-TBD, and the NAS IRDs for each WARP acquisition stage. Test procedures shall describe the step-by-step approach for satisfying the requirement(s), including, at a minimum, personnel, equipment, schedule, and location. No formal testing will commence until the procedures have been reviewed and approved by the FAA.

Each DT&E procedure should include the following components:

a. Test Description/Objective;
b. Critical Issues;
c. Test Setup;
d. Test Method;
e. Expected Results.

Detailed test plans/procedures for each test requirement and/or test objective must include a clear statement of the test objective or test requirement, test methodology, test configuration, manning requirements, test success criteria, and data reduction and analysis requirements.

6.2.2 Contractor's Test and Evaluation Reports.

The contractor shall provide test evaluation reports for all completed test phases. The test reports shall describe evaluation criteria, results (pass/fail), and all relative supporting material. Each report prepared by the contractor shall be approved by the FAA before the next test phase begins.

6.3 DT&E OBJECTIVES.

The DT&E test objectives include:

a. verification of all physical, functional, performance, and interface requirements as delineated in FAA-E-TBD, and associated IRDs, as specified for each WARP stage in section J-4 of the WARP RFP;

b. identification of safety deficiencies;

c. assessment system reliability;

d. verification of nondegradation of previous stage(s) capability for stages 1a and 2.

6.4 DT&E EVENTS/SCOPE OF TESTING/BASIC SCENARIOS.

The contractor shall design, code, and test computer software units for the WARP interfaces and functionality in compliance with the requirements stated in FAA-E-TBD and DOD-STD-2167A. Initial contractor testing on the WARP system shall be accomplished at the contractor's facility. Once the contractor completes DT&E FAT on the first article at the factory, systems shall be delivered for OT&E Integration, OT&E Operational, and OT&E Shakedown testing. DT&E SAT shall be conducted on the delivered limited production WARP systems prior to initiation of OT&E testing.

6.4.1 Reliability.

The WARP contractor shall conduct a reliability program in accordance with FAA-E-TBD and the WARP SOW. The test procedures shall conform to the technical requirements of MIL-STD-785, Tasks 201, 202, 203, and 303. Each system shall meet a minimum Mean Time Between Failures (MTBF) of 2190 hours. MTBF data shall be collected throughout DT&E and OT&E testing. Reliability shall be demonstrated during DT&E and as required during OT&E Integration, OT&E Operational, OT&E Shakedown, PAT&E, and field shakedown testing. ACW-200B and AOS-530 will verify the WARP system meets this reliability requirement. Contractor testing during DT&E FAT shall include an operability test to ensure the WARP system can operate without failure for an extended period of time.

6.4.2 Maintainability.

The WARP contractor shall conduct a maintainability program in accordance with FAA-E-TBD and the WARP SOW. The program shall be carried out according to the requirements of MIL-STD-470, Tasks 201, 202, and 203. The MTTR shall not exceed 0.5 hour. A maximum time allowed for a single repair shall be in accordance with the requirements of FAA-E-TBD and the SOW. Maintainability shall be demonstrated during DT&E and as required during OT&E Integration, OT&E Operational, OT&E Shakedown, PAT&E, and field shakedown testing. ACW-200B and AOS-530 will verify this maintainability requirement.

6.4.3 Availability.

The contractor shall demonstrate operational availability (A_o) by verifying inherent availability (A_i) of .9995 and performing a 48-hour operability test. For the purposes of operational availability calculations, the MTTR is taken as the total time of all interruptions of service regardless of the cause or duration of each. Service interruptions do not include natural disasters. Availability shall be demonstrated during DT&E and as required during OT&E Integration, OT&E Operational, OT&E Shakedown, PAT&E, and field shakedown testing. ACW-200B and AOS-530 will verify this availability requirement.

6.4.4 Contractor Electromagnetic Interference (EMI) Testing.

The contractor shall perform inspection and analysis to ensure the WARP does not interfere with other equipment at the installation site and describes how the EMI requirement delineated in FAA-E-TBD shall be verified during DT&E.

6.5 CRITICAL DT&E ITEMS.

DT&E testing will verify the following WARP critical operational issues:

a. WARP CHI is compliant with X-Windows Standards and Open System Foundation Motif Style Guide;

b. A standard WARP configuration is capable of supporting all required sites with site unique adaptation;

c. WARP system memory and CPU margin requirements;

d. Compliance of developed software documentation with FAA-STD-026.

DT&E testing will verify several requirements (performance and availability) that differ from the correlated requirement specified in the NAS. In the case of availability (NAS requirement is .9995 while WARP specification is .99963) and most performance requirements, the WARP specification requirements are tighter than those specified in the NAS. For these cases, the WARP specification numbers will be used during DT&E testing with the NAS numbers used during OT&E. The following WARP specification requirements do not meet the correlated NAS requirements:

Requirement	NAS Number	ORD Number	WARP Number
Generation of image products			
satellite products	30 seconds	15 minutes	15 minutes
national mosaic	30 seconds	3 minutes	3 minutes
Generation of gridded products	5 minutes	5 minutes	15 minutes

For satellite products, the generation time specified in the WARP specification includes the time to generate **ALL** products available from one satellite pass including sectorization time. For the national mosaic product, the generation time is not a factor when coupled with the requirements to have a national mosaic product available for display every 5 minutes with no data older than 20 minutes and the most current data used. For the gridded products, the generation time in the WARP specification addresses generation of gridded products interpolated temporally out to 12 hours and vertically for constant altitudes at one time. Products are then disseminated to ACCC versus 1 zero hour forecast product generated in 5 minutes followed by the rest of the interpolated products over a 30-minute time frame as specified for the RWP program.

7. OT&E INTEGRATION.

OT&E Integration consists of testing the NAS System requirements allocated to the WARP subsystem as specified in NAS-SS-1000, volume I (System Level), volume II and volume V (Subsystem Level). This testing establishes the capability of the WARP subsystem to be successfully integrated into the NAS system. To the greatest extent possible, subsystem testing will be tested in a NAS equivalent environment.

7.1 OT&E INTEGRATION TO DATE.

No testing has been completed to date.

7.2 OT&E INTEGRATION FUTURE TESTING.

ACW-200B will develop procedures and conduct testing to verify all WARP NAS-SS-1000 related requirements. Test schedules are provided in appendix B. The OT&E Integration tests will verify WARP physical, functional, performance, and operational NAS requirements.

7.2.1 OT&E Integration Test Procedures.

OT&E Integration test procedure development will incorporate guidance provided in FAA Order 1810.4B; appendix 1, and FAA-STD-024a and will ensure compliance with NAS-SS-1000, volumes I, II, and V requirements. Procedures will be developed to ensure successful integration of the WARP into the NAS. The OT&E Integration test cycle may include a phased approach. Each OT&E procedure should include the following components:

a. Test Description/Objective;
b. Critical Issues;
c. Test Setup;
d. Test Method;
e. Expected Results.

Detailed test plans/procedures for each test requirement and/or test objective must include a clear statement of the test objective or test requirement, test methodology, test configuration, manning requirements, test success criteria, and data reduction and analysis requirements.

7.3 OT&E INTEGRATION OBJECTIVES.

This testing is to ensure the successful integration of the WARP subsystem into the NAS. The WARP must be operationally integrated with other operational NAS systems. Full integration scenarios will be employed which will verify all available interfaces.

7.4 OT&E INTEGRATION EVENTS/SCOPE OF TESTING/BASIC SCENARIOS.

NAS integration requirements are derived from the NAS System Specification (NAS-SS-1000), and require the WARP to interface to the WMSCR, neighboring WARP(s), MPS, ACCC, ADAS, the external CTS, and the non-NAS interfaces designated in paragraph 3.2.3. ACW-200B will determine the methodology for testing these interfaces, either through actual connection or simulation. Subsystems that

interface with the WARP will be connected one at a time. A full and independent exercise of each interface will verify the WARP compatibility with that interface. After individual interface testing has been completed, testing of the WARP with multiple interfaces will occur. These test results will be used as input to make the final deployment decision.

In the event that an interface is unavailable at the time of OT&E Integration and OT&E Operational testing, ACW-200B will defer testing, question that interface requirement in the VRTM, and place an unavailable (deferred) "q" status in the VRTM remarks section. ACW-200B, in agreement with the Program Office, may test that interface when that interface becomes available.

7.4.1 OT&E Integration WMSCR/WARP Testing.

This testing will verify that the WARP complies with NAS-SS-1000, volumes I and II requirements. This testing will be conducted to ensure end-to-end compatibility of transport and applications layers (OSI Layers 4 and 7) in accordance with the WARP to WMSCR Interface Requirements Document, NAS-IR-25072515. Physical, data, and network layers (OSI Layers 1 through 3) will be tested via the National Airspace Data Interchange Network (NADIN) II interface. The WARP/WMSCR interface will be tested in two steps. The first test will verify WMSCR to NADIN X.25 protocol conformance certification process as described in the NADIN II System Specification and NADIN/X.25 Packet Mode User's IRD, NAS-IR-43020001. This testing verifies physical, link, and network layers are operating in conformance with CCITT Recommendation X.25. WARP/WMSCR testing will assure compliance with the OSI model ISO/OSI 8073. This testing (end to end) will consist of transport (Class 4) and application layer testing to ensure data flow across the interface provided the interface to the WARP exists in the NAS at the time of testing. If the interface does not exist for this test, the interface will be given a deferred "q" status.

7.4.2 OT&E Integration WARP/WARP Testing.

WSR-88D radar products will be exchanged between the WARP and its neighboring WARP(s) application processes. WARP/WARP testing will verify that the WARP complies with NAS-SS-1000, volumes I and II requirements. This testing will be conducted to ensure end-to-end compatibility of transport and applications layers (OSI Layers 4 and 7) in accordance with the WARP to WARP Interface Control Document ICD-TBD. Physical, data, and network layers (OSI Layers 1 through 3) will be tested via the National Airspace Data Interchange Network (NADIN) II interface. The WARP/WARP interface will be tested in two steps. The first test will verify WARP to NADIN X.25 protocol conformance certification process as described in the NADIN PSN System Specification and NADIN/X.25 Packet Mode User's IRD, NAS-IR-43020001. This testing verifies physical, link, and network layers are operating in conformance with CCITT Recommendation X.25. WARP/WARP testing will assure compliance with the OSI model ISO/OSI 8073. This testing (end to end) will consist of transport (Class 4) and application layer testing to ensure data flow across the interface provided the interface to the WARP exists in the NAS at the time of testing.

7.4.3 OT&E WARP/MPS Integration Testing.

Status, failure data, and maintenance control requests will be exchanged between the WARP and MPS application processes. WARP/MPS testing will verify that the WARP complies with NAS-SS-1000, volumes, I, II, and V requirements. This testing will be conducted to ensure end-to-end integrity of the physical and data link layers (OSI Layers 1 and 2) in accordance with the WARP to MPS Interface Requirements, Document NAS-IR-51030002, provided the interface to the WARP exists in the NAS at the time of testing. If the interface does not exist for this test, the interface will be given a deferred "q" status.

7.4.4 OT&E WARP/ACCC Integration Testing.

WSR-88D radar mosaic products and other weather data will be exchanged between the WARP and ACCC application processes. WARP/ACCC testing will verify that the WARP complies with NAS-SS-1000, volumes I and II requirements. This testing will be conducted to ensure end-to-end integrity of the physical and data link layers (OSI Layers 1 and 2) in accordance with the WARP to ACCC Interface Requirements, Document NAS-IR-21012515, provided the interface to the WARP exists in the NAS at the time of testing. If the interface does not exist for this test, the interface will be given a deferred "q" status.

7.4.5 OT&E WARP/ADAS Integration Testing.

AWOS weather observation data will be exchanged between the WARP and ADAS application processes. WARP/ADAS testing will verify that the WARP complies with NAS-SS-1000, volumes I and II requirements. This testing will be conducted to ensure end-to-end integrity of the physical and data link layers (OSI Layers 1 and 2) in accordance with the WARP to ADAS Interface Requirements Document, NAS-IR-25152508, provided the interface to the WARP exists in the NAS at the time of testing. If the interface does not exist for this test, the interface will be given a deferred "q" status.

7.4.6 OT&E Integration CTS/WARP Testing.

Accuracy and the time needed to achieve time lock will be evaluated and will ensure the interface is in accordance with the CTS to User Subsystem IRD, NAS-IR-92020000. This testing will also verify the WARP complies with NAS-SS-1000, volumes I and II and NAS-IR-92020000 requirements. Receipt of a digital coded time message by the WARP from the CTS will be verified via an EIA-232D interface.

7.4.7 OT&E WARP/ACF Integration Testing.

The WARP system will be installed at all sites in accordance with the WARP to ACF IRD, NAS-IR-61002515. The interface requirements will be tested during DT&E FAT and DT&E SAT and will be verified by inspection of DT&E FAT test reports for OT&E Integration testing.

7.4.8 NAS External Interface Testing.

The WARP will have interfaces external to the NAS to the TM Coordinator, CWSU Meteorologist, and the WARP Vendor in accordance with NAS-SS-1000 and to the directly connected WSR-88D radars in accordance with appendix C of the WARP specification. These interfaces will be tested for operational useability.

Testing of the displays and operator interface will be emphasized. User performance will be assessed relative to effective system operation. This assessment will include addressing issues such as man-machine interface and operator workload. Product data flow will also be verified for these interfaces.

7.5 CRITICAL OT&E INTEGRATION ITEMS.

The critical OT&E Integration items are the availability of operational interfaces with other subsystems in the NAS.

8. OT&E OPERATIONAL TESTING.

This testing, will involve field air traffic control personnel and CWSU meteorologists as an integral part to support ACW-200B in the OT&E Operational test effort. Air traffic control personnel will be actively involved in the hands-on evaluation of the WARP equipment.

8.1 OT&E OPERATIONAL TO DATE.

No testing has been performed to date.

8.2 OT&E OPERATIONAL FUTURE.

ACW-200B will develop and perform OT&E operational tests on the WARP. These tests will occur at the FAA Technical Center and may include follow-on site testing at various ARTCC/ACF facilities if all interfaces are not verified at the Technical Center. A decision on this issue will be made prior to DRR. Test schedules for OT&E are provided in appendix B.

8.2.1 OT&E Operational Test Procedures.

OT&E Operational test procedure development will incorporate guidance provided in FAA Order 1810.4B; appendix 1, and FAA-STD-024a. The OT&E Operational test procedures will determine the degree to which the WARP can be operationally placed into the NAS. Each procedure should include the following components:

a. Test Description/Objective;
b. Critical Issues;
c. Test Setup;
d. Test Method;
e. Expected Results.

Detailed test plans/procedures for each test requirement and/or test objective must include a clear statement of the test objective or test requirement, test methodology, test configuration, manning requirements, test success criteria, and data reduction and analysis requirements. All WARP operational requirements which can be tested at the FAA Technical Center will be verified. Any operational requirements which cannot be tested at the FAA Technical Center will have to be verified at an ARTCC site.

8.3 OT&E OPERATIONAL OBJECTIVES.

This testing is to ensure the operational effectiveness and suitability of the equipment with user participation in the evaluation testing. The objectives of OT&E Operational as per FAA Order 1810.4B are listed as follows:

a. Reliability, maintainability, and availability;
b. Degraded operations and operational utilization scenarios;
c. Stress and NAS loading testing of all interoperable subsystems;
d. Human factors;
e. Safety and security;
f. Site-adaptation data;
g. Transition switchover.

8.4 OT&E OPERATIONAL EVENTS/SCOPE OF TESTING/BASIC SCENARIOS.

8.4.1 Reliability, Maintainability, and Availability Testing.

8.4.1.1 Reliability Analysis.

FAA Technical Center personnel will collect failure data which will be scored as a Relevant Failure or a Nonrelevant Failure (not inherent to the equipment). ACW-200B will review reliability data provided during DT&E to perform a reliability trend analysis. At that time, ACW-200B will recommend to the program office if additional reliability testing is required during OT&E.

The trend analysis will be used by ACW-200B to predict system reliability to the configuration item level. Failure rate analysis will be based on actual operational experience, test data, experience with similar systems, and manufacturer specifications.

8.4.1.2 Maintainability Testing.

The WARP will be tested by ACW-200B to predict system maintainability to the configuration item level. System fault(s) will be generated during the OT&E Operational test cycle to verify contractor maintenance requirements. These requirements include the ability of maintainers to diagnose and isolate faults, repair or replace modules, and perform operational checkout of the repaired item in accordance with the WARP maintenance concept and procedures. Certification of the procedures to determine the WARP readiness to be put back into operation after repair shall be demonstrated by the contractor and reviewed by the FAA. Maintenance documentation, including technical manuals and maintenance log entries will be reviewed/observed for clarity and detail. The latest baselined software version will be reinstalled on the system after an introduced system fault is corrected.

8.4.1.3 Availability Analysis.

Failure data and maintainability test results will be used in computing WARP system availability throughout all testing cycles. This analysis will be presented in the final DT&E Report. If DT&E satisfies the availability requirement, OT&E analysis will not be required.

8.4.2 Degraded Operations and Operational Utilization Scenarios.

The OT&E team will make assessments regarding failures of the WARP equipment, WMSCR node(s), WARP/WARP, WARP/ADAS, WARP/MPS, and WARP/ACCC product/data flow. Alternate product routing (e.g., two WMSCR nodes from National Aviation Weather Processing Facilities (NAWPF) sites) will also be assessed after a WMSCR nodal failure is simulated. Operational utilization will be monitored to establish peak memory usage percentage and processor busy time percentage, etc. Capabilities evaluated will be startup and shutdown procedures, performance levels provided under degraded modes, error recovery capabilities, data integrity, system reconfiguration capabilities (customization) and backup capabilities/procedures.

8.4.3 Stress and NAS Loading Testing of All Interoperable Subsystems.

Testing to ensure system integrity and performance requirements will be performed during peak operation ingest periods. A time window will be selected, most likely around the top of the hour, to demonstrate operational performance requirements noted in the WARP System Specification FAA-E-TBD. The peak ingest window will be determined using the data product input times from all WARP sources. The system will be evaluated on its response to message traffic level variations.

8.4.4 Operational Human Factors Evaluation.

Human factors from meteorologist and air traffic coordinator perspectives will be evaluated as per FAA Order 1810.4B. Useability of information (messages, displays, graphics, alarms) and data entry devices, response times of the operator and equipment will be evaluated. User workload will be evaluated specifically for effects on efficiency, productivity, and safety. The user operational environment will be evaluated for lighting, temperature, noise, and workstation design. MIL-STD-1472D will be used as a guideline for the human factors evaluation.

8.4.4.1 Briefing Terminal User Human Factors Evaluation.

Briefing terminal users from the key sites will be given questionnaires regarding the use of the WARP briefing terminal displays. These questionnaires will address ease of use, and an assessment of the system's reliability in providing graphic and/or alphanumeric data.

8.4.4.2 Meteorologist's Human Factors Evaluation.

Meteorologists from the key sites will be given questionnaires regarding the use of the WARP workstation. These questionnaires will address ease of use and an assessment of the system's reliability in providing graphic and alphanumeric data.

8.4.5 Site Adaptation Data.

Variations in site adaptation-data, which adapt the subsystem to the operational environment through adaptation parameters, should not degrade the operational performance of the system. Assessments will be made and noted in the OT&E Operational Final Report regarding site specific operational adaptation issues.

8.4.6 Safety and Security.

8.4.6.1 Safety Evaluation.

A safety checklist will be developed by the FAA Test Team and implemented at all testing sites. Electrical power connections, grounding, sharp edges, and maintenance safety considerations will be evaluated. The Safety Evaluation's Checklist and findings will be included in the Final OT&E Test Report.

8.4.6.2 Security Evaluation.

A security checklist, which assesses security compliance with NAS-SS-1000 directives, will be developed by the FAA Test Team, and implemented at testing. The Final OT&E Test Report will indicate any areas where appropriate physical or password security is lacking.

8.4.7 Transition Switchover.

The WARP will be evaluated to determine if it is capable of being inserted into, and removed from, the NAS architecture without degrading field operation. Degradation can be measured in terms of loss of operational functions being performed at the time of transition switchover, connectivity or communications, operational data or excessive loss of performance, or degradation of the operational functions that are performed. An assessment will be made which will note potential problems or similarities in operation/maintenance between existing MWP and newly operational WARP systems. This assessment will be included in the Final OT&E Test Report.

8.5 CRITICAL OT&E OPERATIONAL ITEMS.

The critical OT&E Operational items are the availability of operational interfaces with other subsystems in the NAS and the adequacy of technical and training documentation. Unavailable NAS subsystems required for OT&E testing will not be tested during OT&E. WARP systems will be deployed without testing those subsystems that are unavailable beyond simulator testing during DT&E. Resolution of responsibility for testing of the interfaces when the NAS subsystem becomes available will be handled via agreements reached by the responsible FAA program offices.

The following critical operational issues will be addressed during OT&E Operational testing:

a. WARP system Computer-Human Interface (CHI);
b. WARP system RMA;
c. Operational validity/effectiveness of WARP data sources/products.

9. OT&E SHAKEDOWN TEST.

Shakedown testing will be conducted by AOS-500 to verify that WARP can be operated and maintained by typical operator and maintenance personnel. It will reflect the integrated readiness of the people, procedures, and system to assume operational status. Its focus will be on man-machine interface and system support issues. These issues will be resolved by determining the effectiveness of the programs and system support tools that were developed concurrently with the system such as logistic support, training, procedures, documentation, and human factors. These programs and tools; which provide the expertise, information, methodology, spare parts, manpower and human interface features required to operate and maintain the system, will be evaluated during shakedown by using typical operator and maintenance tasks as the framework for the Shakedown Test structure. Shakedown will provide an assessment of the integrated effectiveness of these programs and tools in a realistic operational environment and relate this assessment in terms of operational impact.

9.1 OT&E SHAKEDOWN TESTING TO DATE.

No testing has been performed to date.

9.2 OT&E SHAKEDOWN FUTURE TESTING.

Future Shakedown testing will fall into two categories: Regional Shakedown testing and Follow-on AOS Shakedown testing.

Regional Shakedown tests are conducted by regional AF and operational personnel at each facility where the WARP system is installed. AOS-500, if requested, will provide their Shakedown test plans and procedures for local adaptation.

Follow-on AOS Shakedown testing will be conducted as required to test items in the Shakedown test plan that were not tested during the originally scheduled Shakedown at the FAA Technical Center due to unavailable test equipment, system interfaces, or other test constraints. Follow-on testing may be conducted at one of the operational sites. AOS Shakedown Follow-on testing will be required for succeeding stages of WARP implementation.

9.3 OT&E SHAKEDOWN TEST PROCEDURES.

The Shakedown test team will develop test procedures and scripts using job related tasks as the framework for the structure of the Shakedown test. Because Shakedown is a useability and maintainability test each test procedure will be based on real-world, system related, mission or maintenance, oriented tasks. Shakedown will determine the ease with which these tasks can be accomplished by evaluating the effectiveness of programs and tools that enable operator and maintenance personnel to use and maintain the system.

Shakedown test procedures and scripts will be developed in accordance with FAA Order 1810.4b, appendix 1. Each test procedure/script will include as a minimum the following components:

a. TEST DESCRIPTION/OBJECTIVE: (Job related task e.g., update data base)

b. CRITICAL ISSUES: (The critical issues that may apply to performing this task along with a description of the qualities of each critical issue, that if lacking, will impact the ability to perform the task; e.g., Documentation: Standards, tolerances, and procedures are correct. All information required for this operation is available. Logistic Support Engineering support is available if problems are encountered beyond local abilities.)

c. TEST METHOD: (A description of how this test will be accomplished, e.g., Update system data base to... Use the following documentation... Check logistic support by... etc.)

d. EXPECTED RESULTS: (A description of acceptable operational requirements, e.g., System data base can be routinely updated within... Knowledgeable second level support is available to resolve unexpected problems... etc.)

9.4 OT&E SHAKEDOWN OBJECTIVES.

Shakedown is a final check offering a balance to expediency. Because its objective is to identify any problem that may obstruct a smooth and lasting transition to full system operational status, Shakedown is not restricted in scope to system specifications and requirements. It is conducted on the premise that it is usually less expensive to discover and fix system problems prior to deployment than it is to repair or modify multiple systems after deployment. Shakedown fulfills this objective by reporting problems discovered during Shakedown in terms of operational impact so that DRR members are better equipped to assess deployment risks.

9.5 OT&E SHAKEDOWN EVENTS/SCOPE OF TESTING/BASIC SCENARIOS.

OT&E Shakedown testing will evaluate a system under realistic field conditions. Testing will be designed to reflect the integrated readiness of people, procedures, and the system to assume operational status. OT&E Shakedown testing will evaluate field operations.

OT&E Shakedown testing requires a unique approach. The test must evaluate all aspects of the system's use and maintenance under realistic field conditions. Previous testing has validated specification and NAS interface requirements. OT&E Shakedown planning should address at a minimum:

a. Suitability - This includes data displays, safety, labor intensiveness, and other functions;

b. Training - People trained on the system can accomplish assigned tasks;

c. Procedures - Procedures to operate the system are in place and provide a straightforward and effective means to accomplish user requirements;

d. Other Factors - Compatibility and manpower supportability.

This approach is not intended to limit the scope of testing but does provide focus. Some functional testing may be required to satisfy specific user concerns or because previous testing was incomplete due to laboratory or resource constraints at the time.

Test results are rated in terms of operational impact. The risk of use in the field is evaluated using test results. The results are forwarded in a Quick Look Report to assist the DRR to assess the risk of system deployment.

9.6 CRITICAL OT&E SHAKEDOWN ISSUES.

A critical Shakedown test issue is any issue that may arise prior to deployment that may cause a severe adverse operational impact. But, because the Shakedown test niche in the overall test program is useability and maintainability, initial Shakedown test planning focus is on man-machine interface issues. Therefore, the critical Shakedown test issues are:

a. Documentation
b. Training
c. Procedures
d. Logistics
e. Human Factors

This initial approach, however, is not intended to limit the scope of Shakedown should other issues arise that may pose a threat to system implementation or operation.

10. PAT&E.

WARP PAT&E will occur after a DRR EXCOM deployment decision for stages 1a and 1b and after successful follow-on OT&E for stage 2. The contractor shall prepare and conduct a PAT&E SAT of the WARP system at each operational site after installation of WARP. The PAT&E SAT shall verify the capability of the WARP System to meet functional, interface, and performance requirements of FAA-E-TBD. PAT&E SAT procedures will be validated during DT&E SAT and constitute part of PAT&E SAT at the field deployment sites. During the PAT&E SAT conduct, live NAS interfaces shall be used.

11. SPECIAL RESOURCE SUMMARY.

11.1 TEST ARTICLES.

The test article/System Under Test (SUT) will be the WARP. Four limited production WARP systems will be procured to support the WARP testing effort. The four limited production systems will consist of two systems for OT&E (one to test the ARTCC/ACF requirements and one to test the ATCSCC requirements), one for the first ARTCC/ACF site and one for development at the contractor's facility. Following DRR approval, WARP systems will be acquired for the remaining ARTCC/ACFs and one for the FAA Academy for training.

11.2 SPECIAL SUPPORT REQUIREMENTS.

11.2.1 Protocol Analyzer.

A protocol analyzer will be used during testing to access and capture the OSI layers between the interfaces. ACW-200B will provide any required protocol analyzers used in testing.

12. TEST REPORTS.

12.1 DT&E TEST REPORTS.

12.1.1 Final Test Report.

The Final DT&E Test Reports will be completed by the WARP contractor within 90 working days after completion of DT&E testing, and again after SAT testing, including regression. The Final Test Report will be approved by the Division Manager/APMT prior to release. A Final Test Report requires clearly stated objectives, accurate technical content, conclusions and recommendations and will address all aspects of DT&E testing.

At a minimum, the final DT&E test report will contain the status (pass/fail) of all requirements tested during DT&E, any critical issues that occurred during OT&E testing, recommendations for actions to resolve the critical issues and test requirement failures, and a recommendation on whether or not to proceed to the next test phase.

12.2 OT&E INTEGRATION AND OT&E OPERATIONAL TEST REPORTS.

12.2.1 Quick Look Report.

ACW-200B will conduct OT&E Integration and OT&E Operational testing and generate a Quick Look Report within 15 working days after the completion of the OT&E Integration and OT&E Operational testing and again for any additional regression testing. The Quick Look Report will contain a preliminary synopsis of the results of OT&E Integration and OT&E Operational testing. Further data analysis study will be required after the Quick Look Report is generated before conclusions and recommendations are made.

12.2.2 Final Test Report.

The Final OT&E Test Report will be completed by ACW-200B within 90 working days after completion of all testing including regression, and will be in Technical Note format. The Technical Note will be approved by the Program Manager prior to release. CT 1710.2B, Preparation and Issuance of Formal Reports, Technical Notes, and Other Documentation, provides guidance regarding Technical Note formats. Technical Note requires clearly stated objectives, accurate technical content, conclusions and recommendations. One Technical Note will address all aspects of OT&E Integration and OT&E Operational testing.

At a minimum, the final OT&E test report will contain the status (pass/fail) of all requirements tested during OT&E, any critical operational issues that occurred during OT&E testing, recommendations for actions to resolve the critical operational issues and test requirement failures, and a recommendation on whether or not to proceed to the next test phase.

12.3 OT&E SHAKEDOWN TEST REPORTS.

12.3.1 Quick Look Report.

AOS-530 will conduct OT&E Shakedown testing and generate a Quick Look Report within 15 working days after the completion of the OT&E Shakedown testing. The Quick Look Report will contain a preliminary synopsis of the results of OT&E Shakedown testing. Further data analysis study will be required after the Quick Look Report is generated before conclusions and recommendations are made.

12.3.2 Final Test Report.

The Final OT&E Shakedown Test Report will be completed by AOS-530 within 90 working days after completion of OT&E Shakedown testing.

At a minimum, the final OT&E Shakedown test report will contain the status (pass/fail) of all requirements tested during OT&E Shakedown, any critical operational issues that occurred during OT&E Shakedown testing, recommendations for actions to resolve the critical operational issues and test requirement failures, and a recommendation on whether or not to proceed to the next test phase.

12.4 PAT&E TEST REPORTS.

12.4.1 Final Test Report.

The Final PAT&E Test Reports will be completed by the WARP contractor within 90 working days after completion of PAT&E FAT testing, and again after PAT&E SAT testing, including regression. The Final Test Report will be approved by the Division Manager/APMT prior to release. A Final Test Report requires clearly stated objectives, accurate technical content, conclusions and recommendations and will address all aspects of PAT&E testing.

13. ACRONYMS AND ABBREVIATIONS.

AAF	Associate Administrator for Airway Facilities
ACCC	Area Control Computer Complex
ACF	Area Control Facility
ACN	Engineering, Test and Evaluation Service
ACW	Engineering, Integration and Operational Evaluation Service
ADAS	AWOS Data Acquisition System
AF	Airway Facilities
AFS	Flight Standards Service
AND	NAS Development Service
ANS	NAS Transition and Implementation Service
ANW	Weather/FSS Service
AOS	Operational Support Service
APM	Associate Program Manager
APME	Associate Program Manager for Engineering
APML	Associate Program Manager for Logistics
APMQ	Associate Program Manager for Quality
APMT	Associate Program Manager for Test
ARD	Research and Development Service
ARTCC	Air Route Traffic Control Center
ASD	Associate Administrator for System Engineering and Development
ASE	NAS System Engineering Service
ASU	Acquisition Support Office
AT	Air Traffic
ATC	Air Traffic Control
ATCSCC	Air Traffic Control System Command Center
ATM	Air Traffic System Management Office
ATP	Air Traffic Rules and Procedures Service
ATQ	Office of Independent OT&E Oversight
ATR	Air Traffic Plans and Requirements Service
AWOS	Automated Weather Observation System
C	Critical
CCB	Configuration Control Board
CCWSU	Command Center Weather Service Unit
CFWARP	Central Flow Weather and Radar Processor
CFWSU	Central Flow Weather Service Unit
CHI	Computer-Human Interface
CMTP	Contractor's Master Test Plan
CO	Contracting Officer
COTR	Contracting Officer's Technical Representative
CTS	Coded Time Source
CWA	Center Weather Advisories
CWP	Central Weather Processor
CWSU	Central Weather Service Unit
DCE	Data Circuit-Terminating
DOD	Department of Defense
DRR	Deployment Readiness Review
DT&E	Developmental Test and Evaluation
DTE	Data Terminal Equipment
EMI	Electromagnetic Interference
EXCOM	Executive Committee

FAA	Federal Aviation Administration
FAATSAT	FAA Telecommunications Satellite
FAT	Factory Acceptance Test
GIM	General Information Messages
HZW	Hazardous Weather Outline
IAO	Instrument Flight Rules Area Outlines
ICD	Interface Control Document
IFR	Instrument Flight Rules
IOT&E	Independent Operational Test and Evaluation
IRD	Interface Requirements Document
ISO	International Organization for Standardization
JAI	Joint Acceptance Inspection
KDP	Key Decision Point
km	kilometer
LCN	Local Communications Network
LRI	Lowest Replaceable Item
MIS	Meteorological Impact Statements
MPS	Maintenance Processor Subsystem
MTBF	Mean Time Between Failure
MTTR	Mean Time to Repair
MWP	Meteorologist Weather Processor
NADIN	National Airspace Data Interchange Network
NAS	National Airspace System
NAWPF	National Aviation Weather Processing Facility
NCP	NAS Change Proposal
NDI	Nondevelopmental Item
NEXRAD	Next Generation Weather Radar
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OCD	Operational Capabilities Demonstration
ORD	Operational Requirements Document
OSI	Open Systems Interconnection
OT&E	Operational Test and Evaluation
PAT&E	Production Acceptance Test and Evaluation
PD	Program Directive
PIREPs	Pilot Reports
PM	Program Manager
PMBS	Program Master Baseline Schedule
PSN	Packet Switch Network
QCPP	Quality Control Program Plan
QRO	Quality Reliability Officer
RFP	Request for Proposal
RMA	Reliability, Maintainability, and Availability
RWP	Real-time Weather Processor
SAT	Site Acceptance Test
SECCB	System Engineering Configuration Control Board
SIP	System Integration Plan
SOW	Statement of Work
SUT	System Under Test

TBD	To Be Determined
T&E	Test and Evaluation
TEMP	Test and Evaluation Master Plan
TM	Traffic Manager
TMU	Traffic Management Unit
TPRC	Test Policy Review Committee
TSSR	Test Schedule Status Review
UTC	Universal Coordinated Time
VRTM	Verification Requirements Traceability Matrix
WARP	Weather and Radar Processor
WMSCR	Weather Message Switching Center Replacement
WSR-88D	Weather Surveillance Radar 1988 Doppler
WSU	Weather Service Unit

APPENDIX A

VERIFICATION REQUIREMENTS TRACEABILITY MATRIX (VRTM)

VRTM.

The TEMP VRTM presents high level functional and performance requirements to be tested during WARP test and evaluation. These requirements are derived from NAS-SS-1000, volumes I, II, and V that are allocated to the WARP and CFWARP programs. WARP and CFWARP are categorized by NAS-SS-1000 as NAS subsystems within the Weather Processing subelement and the Air Traffic Control Element of the NAS architecture.

Identification of applicable NAS system-level functional (3.2.1.1.x, volume I) and performance (3.2.1.2.x, volume I) requirements that are allocated to WARP and CFWARP was provided by the Requirements Allocation Matrix in appendix I of NAS-SS-1000, volume I. NAS subsystem-level and maintenance functional requirements for WARP and CFWARP are provided by NAS-SS-1000, volumes II and V, and are also provided in the VRTM. The VRTM in appendix A also provides correlation between NAS-SS-1000 subsystem-level and maintenance functional requirements and the corresponding WARP project-level requirements provided by the WARP System Specification, FAA-E-TBD.

Allocation of verification levels and methods for the requirements listed was provided by tables 4.1-1 provided by volumes I, II, and V of NAS-SS-1000.

The WARP TEMP VRTM is compliant with the current NAS NCP case file for WARP which will be submitted for approval to the SECCB.

COLUMN DEFINITIONS AND UTILIZATION.

Column Definitions for the VRTM are provided as follows:

1. Requirement Identification - An unique identification number is assigned to each testable requirement which is used to reference each requirement throughout the series of WARP test documents produced by ACW-200. NAS system-level requirements are identified with 1000 series identification numbers. NAS subsystem-level requirements are identified with 2000 series identification numbers. NAS maintenance functional requirements are identified with 5000 series identification numbers.

2. NAS Requirement - Provides the applicable paragraph number of NAS-SS-1000 for each requirement. NAS system-level requirements (1000 series IDs) are provided by volume I of NAS-SS-1000; NAS subsystem-level requirements (2000 series IDs) are provided by volume II of NAS-SS-1000; NAS maintenance functional requirements (5000 series IDs) are provided by volume V of NAS-SS-1000.

3. Project Requirement - Provides the corresponding WARP project requirement in FAA-E-TBD that is associated with the NAS-SS-1000 requirement.

4. Description - Describes or restates the NAS-SS-1000 requirement.

5. Verification Level and Method - Presents the levels of testing described in the TEMP and identifies the qualification method that is used to verify the NAS-SS-1000 requirement. Verification levels are as follows:

a. OCD - Operational Capabilities Demonstration;
b. FAT - Factory Acceptance Test;
c. OT&E INT - OT&E Integration Test;
d. OT&E OPER - OT&E Operational Test;
e. OT&E SHAKEDOWN - OT&E Shakedown Test;
f. SAT - Site Acceptance Test.

The qualification methods assigned to each requirement are detailed later in this section.

6. Requirement Status - Identifies whether the requirement is critical (C) or noncritical (N). If a requirement cannot be verified due to the unavailability of other NAS subsystems, testing of it is deferred. Those requirements that are not subject to testing are identified with the letter "Q" inside this column.

7. Remarks - Provides additional information about the requirement.

QUALIFICATION METHODS.

Four qualification methods are used to verify NAS-SS-1000 requirements: Inspection, Analysis, Demonstration, and Test.

1. Inspection - Inspection is validation by visual examination of the item, reviewing descriptive documentation, and comparing the appropriate characteristics with a predetermined or reference standard, to determine compliance with requirements, without the use of special laboratory equipment or procedures.

2. Analysis - Analysis is validation by technical/mathematical evaluation or simulation using mathematical representations and representative data to prove that specified requirements are met. Representative data may include data collected from previous or other equipment and system verification.

3. Demonstration - Demonstration is an uninstrumented test, where success is determined from observation alone. Included in this category are tests whose results can easily be determined on a pass-fail basis.

4. Test - Test is validation, through systematic exercising of an item under all appropriate conditions, along with collection, analysis, and evaluation of quantitative data for predetermined performance characteristics. Acceptability is determined by the comparison of the data with preestablished quantitative requirements and occurrences.

NAS-SS-1000 VOLUME I REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO.	VOLUME I PARAGRAPH # x = 3.2.1	FAA-E-TBD PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
1001	x.1.1.1.D	x.1.6	The NAS shall disseminate advisory information.	X	D	D	D	I	D	C	
1002	x.1.3.1.G	x.1.1.1.4 x.1.2.1.4 x.1.2.2 x.1.2.3	The NAS shall provide flight planning services to the user by providing current alphanumeric weather and aeronautical information.	D	D	X	D	I	D	C	
1003	x.1.3.1.H	x.1.1.1.4 x.1.1.1..5 x.1.1.1.6 x.1.2.1.4 x.1.2.1.5 x.1.2.1.6.4.1 x.1.2.1.6.5.1 x.1.2.2 x.1.2.3	The NAS shall provide flight planning services to the user by providing forecast alphanumeric and graphic weather information.	D	D	X	D	I	D	C	
1004	x.1.4.1.A	x.1.1.2	The NAS shall accept weather information from external subsystems that support NAS specialists and users.	X	D	D	D	I	D	C	
1005	x.1.4.1.B	x.1.1.1.1 x.1.1.1.2 x.1.1.1.3 x.1.1.1.4 x.1.1.1.5 x.1.1.1.6 x.1.2.1.2.2 x.1.2.1.3.2 20.2	The NAS shall collect and/or sense weather information that pertains to the area of NAS responsibility for terminal and en route operations.	D	A,D	A,D	D	I	D	C	
1006	x.1.4.1.C	3.2.8	The NAS shall provide the capacity and flexibility to support future growth and expandability.	X	I	X	X	I	X		
1007	x.1.4.1.D	x.1.2.2 x.1.2.3	The NAS shall provide tabular and pictorial displays of weather information to support the specialists.	D	D	X	D	I	D		

VERIFICATION METHOD: T = TEST, D = DEMONSTRATION, A = ANALYSIS, I = INSPECTION, L = VERIFIED BY LOWER LEVEL PARAGRAPH REQUIREMENT, X = NOT APPLICABLE

REQUIREMENT STATUS: (REQ STAT) Q = DEFERRED (NOT PRESENT IN NAS), C = CRITICAL

NOTE: The TEMP VRTM identifies NAS-SS-1000 requirements that are allocated to the WARP and CFWARP subsystems. Direct verification of NAS-SS-1000 requirements will be performed by the FAA and will occur during OT&E. Indirect verification of these requirements will occur during OCD, FAT and SAT when cross-referenced subsystem specification requirements, specified by FAA-E-TBD, are verified by the contractor. Verification of subsystem specification requirements are presented in Section 4 of FAA-E-TBD.

NAS-SS-1000 VOLUME I REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO.	VOLUME I PARAGRAPH # x=3.2.1	FAA-E-TBD PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
1008	x.1.4.1.E	x.1.2.4.1	The NAS shall accept input from specialists including annotations or remarks to existing weather information or commands to generate specific weather products.	D	D	X	D	I	D		
1009	x.1.4.1.F	x.1.1 x.1.2 x.1.4	The NAS shall maintain current, trend, and forecast weather information for the area of NAS responsibility.	D	D	X	D	I	D	C	
1010	x.1.4.1.G	x.1.3	The NAS shall classify weather information as hazardous which may impact flight operations.	D	D	X	D	I	D	C	
1011	x.1.4.1.H	x.1.3.1 x.1.3.2	The NAS shall alert the specialists when hazardous weather or NOTAM information is received.	D	D	X	D	I	D	C	
1012	x.1.4.1.I	x.1.6	The NAS shall disseminate weather and NOTAM information to NAS specialists and users in support of flight operations.	X	D	D	D	I	D	C	
1013	x.1.4.1.J	x.1.2.3 x.1.2.4	The NAS shall provide the capacity and flexibility to accept requests from NAS specialists and users.	D	D	X	D	I	D	C	
1014	x.1.4.1.K	x.1.2	The NAS shall generate weather products which support the interpretation of weather conditions by NAS specialists and users.	D	D	X	D	I	D	C	
1015	x.1.4.1.L	x.1.2.1.6.2.1 x.1.2.1.6.6.1 x.1.2.3.1 x.1.2.4.2.2	The NAS shall provide access to current, trend, or forecast weather information by location, route of flight, or geographic area.	D	D	X	D	I	D	C	
1016	x.1.4.1.M	x.1.2.2.6 x.1.2.3.6	The NAS shall provide hardcopy of weather information to support the specialists.	D	D	X	D	I	D		
1017	x.1.4.1.N	x.1.4.3	The NAS shall archive weather information for use in event reconstruction and accident investigation.	D	D	X	D	I	D	C	

VERIFICATION METHOD: T=TEST, D=DEMONSTRATION, A=ANALYSIS, I=INSPECTION, L= VERIFIED BY LOWER LEVEL PARAGRAPH REQUIREMENT, X= NOT APPLICABLE

REQUIREMENT STATUS: (REQ STAT) Q=DEFERRED (NOT PRESENT IN NAS), C=CRITICAL

NOTE: The TEMP VRTM identifies NAS-SS-1000 requirements that are allocated to the WARP and CFWARP subsystems. Direct verification of NAS-SS-1000 requirements will be performed by the FAA and will occur during OT&E. Indirect verification of these requirements will occur during OCD, FAT and SAT when cross-referenced subsystem specification requirements, specified by FAA-E-TBD, are verified by the contractor. Verification of subsystem specification requirements are presented in Section 4 of FAA-E-TBD.

NAS-SS-1000 VOLUME I REQUIREMENTS				VERIFICATION LEVEL AND METHOD						REQ STAT	REMARKS
REQ NO.	VOLUME I PARAGRAPH # x=3.2.1	FAA-E-TBD PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
1018	x.1.8.1.3	x.1.4.3.2	The NAS shall provide data and voice recording and play back capabilities for archiving and reconstruction purposes.	D	D	X	D	I	D		
1019	x.1.9.1.A	x.1.5	The NAS shall continually monitor subsystem performance to obtain the data needed by specialists for maintenance and operations support.	X	A,D	D	D	I	X		
1020	x.1.9.1.B	x.1.5.1.3.2	The NAS shall provide the status of subsystems to specialists and shall generate an alarm upon the deviation of designated parameters from prescribed limits.	X	D	D	X	I	D		
	x.1.9.1.C		The NAS shall provide the capability for a specialist on-site or at an off-site location to control selected subsystems for maintenance purposes..								Reqt is incosistent with no MDT reqt allocation
1021	x.1.9.1.D	x.1.5.2.4	The NAS shall provide the specialist the capability to identify the line replaceable unit causing an equipment failure.	X	D	D	X	I	X		
1022	x.1.9.1.G	x.1.5.2.4	The NAS shall provide the specialist access to the monitoring, control, and data management capabilities of the NAS.	X	D	D	X	I	X		
1023	x.2.3.J	x.1.4.2.1.4	The NAS shall maintain current weather surface observations updated locally and nationally in accordance with section x.2.4.	A	A	A	A	I	D	C	
1024	x.2.3.K	x.1.1.1 x.1.1.3 x.1.3.1.1 x.1.3.1.2 x.1.3.4	The NAS shall acquire and maintain hazardous weather information current locally within 2 minutes and nationally within 30 minutes, in accordance with section x.2.4.	T	T	T	T	I	T	C	

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NOTE: The TEMP VRTM identifies NAS-SS-1000 requirements that are allocated to the WARP and CFWARP subsystems. Direct verification of NAS-SS-1000 requirements will be performed by the FAA and will occur during OT&E. Indirect verification of these requirements will occur during OCD, FAT and SAT when cross-referenced subsystem specification requirements, specified by FAA-E-TBD, are verified by the contractor. Verification of subsystem specification requirements are presented in Section 4 of FAA-E-TBD.

NAS-SS-1000 VOLUME I REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO.	VOLUME I PARAGRAPH # x=3.2.1	FAA-E-TBD PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
1025	x.2.3.L	x.1.1.1.5 x.1.2.5	The NAS shall acquire and maintain forecast weather information and make it available within 10 seconds of a request, in accordance with section x.2.4.	T	T	T	T	I	T	C	
	x.2.3.M	x.1.4.2	The NAS shall provide a national weather database with sufficient capacity to maintain weather information for a time not to exceed 1 hour of identification that the information is no longer valid/relevant, in accordance with facility procedures.								WARP does not perform data perging.
1026	x.2.4.A.3	x.1.1.3	The NAS shall collect satellite imagery data at least once every 30 minutes.	A	A	X	A	I	D	C	
1027	x.2.4.D.4.D	x.1.1.3	The NDS shall collect NWS terminal forecasts, at least once every 6 hours.	D	D	X	D	I	D	C	
1028	x.2.4.D.4.B	x.1.1.3	The NDS shall collect NWS area forecasts, at least once every 12 hours.	D	D	X	D	I	D	C	
1029	x.2.4.D.4.C	x.1.1.3	The NDS shall collect NWS winds aloft forecasts, at least once every 12 hours.	D	D	X	D	I	D	C	
1030	x.2.4.D.4.D	x.1.1.3	The NDS shall collect NWS current surface weather observations, at least once every minute.	X	D	X	D	I	D	C	
1031	x.2.4.A.4.E	x.1.1.3	The NAS shall collect NWS current weather conditions aloft, at least once every 5 minutes.	A	A	X	A	I	D	C	
1032	x.2.4.A.4.F	x.1.1.3	The NAS shall collect NWS weather warnings and advisories, within 15 seconds, after generation.	T	T	X	T	I	T	C	
1033	x.2.4.A.5	x.1.1.3	The NAS shall collect DOD generated data on current surface weather observations at least once every minute.	X	A	X	A	I	D	C	

VERIFICATION METHOD: T=TEST, D=DEMONSTRATION, A=ANALYSIS, I=INSPECTION, L= VERIFIED BY LOWER LEVEL PARAGRAPH REQUIREMENT, X= NOT APPLICABLE

REQUIREMENT STATUS (REQ STAT): Q=DEFERRED (NOT PRESENT IN NAS), C=CRITICAL

NOTE: The TEMP VRTM identifies NAS-SS-1000 requirements that are allocated to the WARP and CFWARP subsystems. Direct verification of NAS-SS-1000 requirements will be performed by the FAA and will occur during OT&E. Indirect verification of these requirements will occur during OCD, FAT and SAT when cross-referenced subsystem specification requirements, specified by FAA-E-TBD, are verified by the contractor. Verification of subsystem specification requirements are presented in Section 4 of FAA-E-TBD.

NAS-SS-1000 VOLUME I REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO.	VOLUME I PARAGRAPH # x=3.2.1	FAA-E-TBD PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
	x.2.4.B.1.A		The NAS shall disseminate terminal weather information classified as hazardous or potentially hazardous within one minute from the time the NAS receives the hazardous weather information.								Reqt is not applicable to WARP in en-route environment.
1034	x.2.4.B.1.B	x.1.6	The NAS shall disseminate en route weather information classified as hazardous or potentially hazardous within two minutes from the time the NAS receives the hazardous weather information.	X	D,A	D,A	D,A	I	D	C	
1035	x.2.4.B.2	x.1.1.3	Current surface weather observation information shall be available to local area specialists and users and updated at least once per minute.	X	D,A	X	D,A	I	D	C	
1036	x.2.4.B.3	x.1.1.3	Current weather conditions aloft information shall be available to local area specialists and users and updated at least once every 5 minutes.	D,A	D,A	X	D,A	I	D	C	
1037	x.2.4.B.4	x.1.6	Current surface weather observation information shall be available to non-local area specialists and users and updated at least once per hour.	D,A	D,A	X	D,A	I	D	C	
1038	x.2.4.B.5	x.1.6	Current weather conditions aloft information shall be available to non-local area specialists and users and updated at least once per hour.	X	D,A	X	D,A	I	D	C	
1039	x.2.4.C.1	x.1.4.2	The NAS shall maintain trend weather information for the past 3 hours.	D,A	D,A	X	D,A	I	D	C	
1040	x.2.4.C.2.A	x.1.4.2	The NAS shall maintain terminal forecasts which cover the next 24 hours.	D,A	D,A	X	D,A	I	D	C	
1041	x.2.4.C.2.B	x.1.4.2	The NAS shall maintain area forecasts which cover the next 24 hours.	D,A	D,A	X	D,A	I	D	C	

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NAS-SS-1000 VOLUME I REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO.	VOLUME I PARAGRAPH # x=3.2.1	FAA-E-TBD PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
1042	x.2.4.C.2.C	x.1.4.2	The NAS shall maintain winds aloft forecasts which cover the next 30 hours.	D,A	D,A	X	D,A	I	D	C	
1043	x.2.4.C.2.D	x.1.4.2	The NAS shall maintain en route advisories which cover the next 12 hours.	D,A	D,A	X	D,A	I	D	C	
1044	x.2.4.C.3	x.1.4.2	The NAS shall maintain satellite imagery data for the past 8 hours.	D,A	D,A	X	D,A	I	D	C	
	x.2.4.C.4		The NAS shall maintain hazardous weather information until the hazard has dissipated. Expired hazardous weather information shall be purged when the hazard no longer exits, no longer affects or no longer has the potential to affect the safe and efficient movement of aircraft within:	L	L	L	L	L	L		Lead-in
	x.2.4.C.4.A	x.1.4.2	One minute for terminal operations.								Not applicable to WARP and en-route operations.
1045	x.2.4.C.4.B	x.1.4.2	Two minutes for en route operations.	T	T	X	T	I	T	C	
1046	x.2.4.C.4.C	x.1.4.2	Thirty minutes nationally.	D,A	D,A	X	D,A	I	D	C	
1047	x.2.4.D.1	x.1.2.1.6.2.1 x.1.2.1.6.5 x.1.2.1.6.6.1	Weather information shall be available for route-oriented retrievals along a corridor up to 200 miles wide along a specified route/altitude of flight.	X	X	X	X	X	X	Q	Stage 3 capability
1048	x.2.4.D.2	x.1.2.1.6.2.1 x.1.2.1.6.6.1 x.1.2.4.2.2.1	Weather information shall be available for area-oriented retrievals and include weather information within a radius of 100 miles from the user/specialist defined location.	X	X	X	X	X	X	Q	Stage 3 capibility
1049	x.2.4.D.3	x.1.2.4.2.2	Weather information shall be available by location, weather-type or time (current vs. forecast).	D	D	X	D	I	D		

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REQ NO.	VOLUME I PARAGRAPH # x=3.2.1	FAA-E-TBD PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
	x.2.4.E		The NAS shall perform all processing required to produce a description of the current, trend, or predicted weather conditions by:	L	L	L	L	L	L		Lead-in
1050	x.2.4.E.1	x.1.2.1	Deriving from raw data the products needed by NAS specialists and users.	D	D	X	D	I	D	C	
1051	x.2.4.E.4	x.1.2.1	Filtering, decoding, editing and reformatting acquired weather data to facilitate its operational use by NAS specialists and users.	D	D,A	X	D,A	I	D	C	
1052	x.2.4.E.5	x.1.2.2.5	Animation overlaying and composition weather data to facilitate its operational use by NAS specialists and users.	D	D	X	D	I	D	C	
	x.2.4.F		The NAS shall construct a real-time depiction of the weather conditions which affects, or has the potential to affect, the safe and efficient movement of aircraft:	L	L	L	L	L	L		Lead-in
1053	x.2.4.F.1	x.1.2.1	At least every 15 minutes for each ATCT, ACF, ATCCC area of responsibility.	D	D	X	D	I	D	C	
1054	x.2.4.F.2	x.1.2.1	Includes the current condition and near-term predictions of the following: thunderstorm location and intensity, precipitation areas, cloud coverage, cloud tops, icing levels, turbulence, winds aloft, clear air turbulence, low level wind shear, and areas of IFR, MVFR, and VFR.	D	D	X	D	I	D	C	
1055	x.2.4.G	x.1.4.3	The NAS shall archive all weather information in accordance with section x.2.8.3.	A	A	X	A	I	A		

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REQ NO.	VOLUME I PARAGRAPH # x=3.2.1	FAA-E-TBD PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
1056	x.2.8.3.A	x.1.4.3.1	The NAS shall record all specified operational data information for support of analysis, e.g., incident/accident investigation, search and rescue operations, or training activities.	D	D,A	X	D,A	I	D		
1057	x.2.8.3.B.2	x.1.4.3.2	The NAS shall retrieve and playback all specified recorded data from off-line storage.	D	D	X	D	I	D		
1058	x.2.8.4.B	3.2.3.4	A system dealing with non-ATC functions (e.g., maintenance, weather, traffic management, flight planning) shall be synchronized to within 6 seconds of universal time coordinated (UTC).	X	A	A	X	I	A		
1059	x.2.8.4.C	3.2.3.4	The NAS shall provide interfacing capabilities to the coded time signal and synchronization in accordance with Volumes II through V of NAS-SS-1000.	X	A	A	X	I	D		
1060	3.2.2.1	3.2.5.1	Subsystem Reliability. The WARP and CFWARP shall have a MTBF of 2190 hours.	X	A	A	X	I	X		
1061	3.2.3.3	3.2.5.2	The WARP and CFWARP shall meet a MTTR of 0.5 hours.	X	A	A	X	I	X		
1062	3.2.4	3.2.5.3.1	The WARP shall have an inherent availability of 0.9995.	X	A	A	X	I	X		
1063	3.2.4	3.2.5.3.2	The CFWARP shall have an inherent availability of 0.99917873.	X	A	A	X	I	X		

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REQ NO.	VOLUME II PARAGRAPH # x = 3.2.1	FAA-E-XXXX PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
			REQUIREMENTS FOR WARP								
	x.5.1		Weather and Radar Processor (WARP). The WARP shall provide the processing support to automatically receive, process, produce, and disseminate weather products to support ATC personnel and meteorologists. The WARP will provide interactive display workstation support for the Center Weather Service Unit (CWSU) meteorologists to generate, display, annotate, and disseminate weather products. The WARP will also provide color terminals for use by ACF supervisors and traffic management specialists to display weather products.	L	L	L	L	L	L		Lead-in
	x.5.1.1		Functional characteristics. The WARP shall provide the following functions:	L	L	L	L	L	L		Lead-in
	x.5.1.1.1		Data collection. The WARP shall accept the following information:	L	L	L	L	L	L		Lead-in
	x.5.1.1.1.1		Weather radar products. The WARP shall accept NEXRAD weather radar products as follows:	L	L	L	L	L	L		Lead-in
2001	x.5.1.1.1.1.1	x.1.1.1.1 x.1.1.1.1.1	Routine Products. The WARP shall routinely accept NEXRAD weather radar products from all NEXRAD weather radars providing coverage in its ACF area of responsibility.	X	D,A	D,A	D,A	I	D	C	

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REQ NO.	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
2002	x.5.1.1.1.1.1.1	x.1.1.1.1 x.1.1.1.1.1	Direct Link. The WARP shall routinely accept the set of products from each of the NEXRAD radars with which it is connected by means of a direct physical link.	X	D,A	D,A	D,A	I	D	C	
2003	x.5.1.1.1.1.1.2	x.1.1.1.1 x.1.1.1.1.1	Indirect Link. The WARP shall also routinely accept these products from neighboring WARPs for radars to which it is not directly connected which are required for completion of mosaic coverage of its area of responsibility.	X	D,A	D,A	D,A	I	D	C	
2004	x.5.1.1.1.1.2	x.1.1.1.1.2	Request/Replay Products. The WARP shall collect non-routine weather radar products on a request/replay basis from radar with which it is directly or indirectly connected.	X	D,A	D,A	D,A	I	D	C	
2005	x.5.1.1.1.2	x.1.1.1.4 x.1.1.2	Alphanumeric Products. The WARP shall accept alphanumeric products generated by external agencies (e.g. NWS, DOD), Pilot Weather Reports (PIREPs), surface observations, and products generated at other WARP locations.	X	D	X	D	I	D		
2006	x.5.1.1.1.3	x.1.1.1.5 x.1.1.2	Binary Data. The WARP shall accept binary encoded weather products generated by external agencies(e.g., NWS) and other NAS subsystems.	D	D	D	D	I	D		For OCDs, receipt of binary data form other NAS subsystems does not apply
	x.5.1.1.1.4		Meteorological Satellite Imagery. The WARP shall accept:	L	L	L	L	L	L		Lead-in

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REQ NO.	VOLUME II PARAGRAPH # x = 3.2.1	FAA-E-XXXX PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
2007	x.5.1.1.1.4(a)	x.1.1.1.2	Geosynchronous meteorological satellite imagery including imagery from visible, infrared, and moisture channels;	D	D,A	X	D	I	D		
2008	x.5.1.1.1.4(b)	x.1.1.1.2	Polar orbiter meteorological satellite imagery for the Alaskan WARP.	D	D,A	X	D	I	D		
2009	x.5.1.1.1.5	x.1.1.1.6	Graphic Weather Data. The WARP shall accept graphic weather data from the NWS and products generated at other WARP locations.	X	D	D	D	I	D		
2010	x.5.1.1.1.6	x.1.1.1.3	Lightning Data. The WARP shall accept lightning data from other sources (e.g., NWS, vendors).	D	D	D	D	I	D		
2011	x.5.1.1.1.7	x.1.2.1.6.1 x.1.2.4.1.1 x.1.2.4.1.2	Meteorologist data. The WARP shall accept alphanumeric and graphic weather products input by the meteorologist.	D	D	X	D	I	D		
2012	x.5.1.1.1.8	3.2.1.1.2.4.2	Data requests. The WARP shall accept and process requests from users and other NAS systems for weather products.	X	D,A	D,A	D	I	D	C	
	x.5.1.1.2		Data distribution. The WARP shall routinely distribute weather products as follows:	L	L	L	L	L	L		Lead-in
2013	x.5.1.1.2.1	x.1.6.2.1	Neighboring WARP. The WARP shall routinely distribute NEXRAD products from radars with which it is directly connected to any neighboring WARP which requires products from one or more of these radars.	X	D,A	D,A	D	I	D	C	

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REQ NO.	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2014	x.5.1.1.2.2	x.1.2.2.1 x.1.2.3.1 x.1.6.1	NAS users. The WARP shall distribute pass-through and WARP-generated weather products to external NAS subsystems,CWSU meteorologists, and briefing terminal users in accordance with table 3.2.1.5.1.3-1.	X	D,A	D,A	D	I	D	C	
	x.5.1.1.3		Display Products. The WARP shall provide data to WARP users as follows:	L	L	L	L	L	L		Lead-in
	x.5.1.1.3.1		Area/line Depiction. The WARP shall provide displays depicting the following weather data to illustrate the area of a weather phenomenon's occurrence or lines along which weather parameters have equal values.	L	L	L	L	L	L		Lead-in
2015	x.5.1.1.3.1(a)	x.1.2.1.1	NEXRAD radar data in image format, including ACF and national mosaics of composite reflectivity and point data products: hail index, storm structure, and storm tracking information;	D	D,A	X	D	I	D	C	Only the National mosaic product for OCD.
2016	x.5.1.1.3.1(b)	x.1.2.1.3.2 x.1.2.1.6.2.4	Surface observation and lightning data in vector or point format;	D	D,A	X	D	I	D		
2017	x.5.1.1.3.1(c)	x.1.2.1.6.2.4	Upper air observation or forecast data in vector or point format;	D	D,A	X	D	I	D		
2018	x.5.1.1.3.1(d)	x.1.2.1.2	Meteorological satellite images.	D	D,A	X	D	I	D		
	x.5.1.1.3.2		Data Plots. The WARP shall plot the following weather data to depict horizontal and/or vertical views of:	L	L	L	L	L	L		Lead-in
2019	x.5.1.1.3.2(a)	x.1.2.1.3 x.1.2.1.6.2.2	Surface observation and lightning data (horizontal view);	D	D,A	X	D	I	D		

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REQ NO.	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2020	x.5.1.1.3.2(b)	x.1.2.1.6.2.2	Upper air observation data;	D	D,A	X	D	I	D		
2021	x.5.1.1.3.2(c)	x.1.2.1.6	NWS, ICAO, and DOD alphanumeric products;	D	D,A	X	D	I	D		
2022	x.5.1.1.3.2(d)	x.1.2.1.5 x.1.2.1.6.4.1 x.1.2.1.6.5.1	Gridded data from external sources (e.g.., DOD, NWS);	D	D,A	X	D	I	D		
2023	x.5.1.1.3.2(e)	x.1.2.1.6.6	PIREPs (horizontal view).	D	D,A	X	D	I	D		
	x.5.1.1.4		Alphanumeric Products. The WARP shall automatically generate the following weather products for display or dissemination:	L	L	L	L	L	L		Lead-in
2024	x.5.1.1.4(a)	x.1.2.1.4.1	Surface observation reformatted report;	X	D,A	D,A	D	I	D	C	
2025	x.5.1.1.4(b)	x.1.2.1.4.1	Terminal forecast reformatted report;	X	D,A	D,A	D	I	D	C	
2026	x.5.1.1.4(c)	x.1.2.1.5	Grid winds and temperatures forecast reformatted report.	X	D,A	D,A	D	I	D	C	
2027	x.5.1.1.5	x.1.2.1.6.1 x.1.2.4.1	Interactively Created Products. The WARP shall provide the meteorologist with the capability to interactively create alphanumeric and graphic products for display or dissemination including, but not limited to:	D	D	D,A	D	I	D	C	
2028	x.5.1.1.5(a)	x.1.2.4.1.1	General Information Messages;	D	D	D,A	D	I	D	C	
2029	x.5.1.1.5(b)	x.1.2.4.1.1	Center Weather Advisories;	D	D	D,A	D	I	D	C	
2030	x.5.1.1.5(c)	x.1.2.4.1.1	Meteorological Impact Statements;	D	D	D,A	D	I	D	C	
2031	x.5.1.1.5(d)	x.1.2.4.1.2	Hazardous Weather Outline;	D	D	D,A	D	I	D	C	
2032	x.5.1.1.5(e)	x.1.2.4.1.2	IFR Area Outline	D	D	D,A	D	I	D	C	

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REQ NO.	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2033	x.5.1.1.6	x.1.4.2	Updating. The WARP shall update its data base and generated products to reflect current data from all data sources.	D,A	D,A	D,A	D	I	D		
	x.5.1.1.7		Weather Alerts. The WARP shall alert the meteorologist to:	L	L	L	L	L	L		Lead-in
2034	x.5.1.1.7(a)	x.1.3.1.2	Hazardous weather conditions in surface observation or terminal forecast products;	X	D	X	D	I	D		
2035	x.5.1.1.7(b)	x.1.3.1.1	Receipt of hazardous weather products and urgent PIREPs.	X	D	X	D	I	D		
2036	x.5.1.1.7(c)	x.1.3.1.2	Receipt of NEXRAD data meeting adaptable parameters, such as reflectivity, turbulence, and echo tops in an adaptable number of grid cells in an adaptable area, or adaptable values of hail index, mesocyclone, tornado vortex signature, or severe weather probability.	X	D,A	X	D	I	D		
2037	x.5.1.1.8	x.1.2.1.1.2 x.1.2.1.2.3 x.1.2.1.5.2 x.1.2.1.6.1 x.1.2.1.6.2.4	Coordinate Conversions. The WARP shall perform coordinate conversions necessary to provide its products to external NAS subsystems in the map projections appropriate to those systems.	X	D,A	D,A	D,A	I	D,A	C	
2038	x.5.1.1.9	x.1.4.2	Data base. The WARP shall maintain a data base of all received and generated products.	A	A	X	A	I	A		
2039	x.5.1.1.10	x.1.4.3	Archiving. The WARP shall archive all products created by the WARP or meteorologist that are generated or disseminated to external NAS subsystems.	D	D,A	X	D,A	I	D,A	C	For products created by the system or user for OCD.

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REQ NO.	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
	x.5.1.1.11		Manual Input. The WARP shall accept the following inputs from the users:	L	L	L	L	L	L		Lead-in
2040	x.5.1.1.11(a)	x.1.2.4	Adaptation or demand requests for weather products;	D	D	X	D	I	D		
2041	x.5.1.1.11(b)	x.1.2.4	New product data;	D	D	X	D	I	D		
2042	x.5.1.1.11(c)	x.1.2.4	Display commands;	D	D	X	D	I	D		
2043	x.5.1.1.11(d)	x.1.2.4	From meteorologists, alphanumeric and graphic annotations to existing products;	D	D	X	D	I	D		
2044	x.5.1.1.11(e)	x.1.2.4.3	From meteorologists, adaptation of weather data parameters for alerts.	D	D	X	D	I	D		
2045	x.5.1.1.12	x.1.2.2.1 x.1.2.3.1	Product Display. The WARP shall be capable of displaying on color graphics display monitors all products that it can receive or generate.	D	D	X	D	I	D		
2046	x.5.1.1.1.12.1	x.1.2.2.5.2	Overlay. The WARP shall provide for overlaying graphic, satellite, and radar image products for display at the same scale and projection.	D	D	X	D	I	D		
2047	x.5.1.1.12.2	x.1.2.2.5.3 x.1.2.3.5.2	Zoom. The WARP shall provide the capability to zoom all satellite, radar, and graphic products.	D	D	X	D	I	D		
2048	x.5.1.1.12.3	x.1.2.2.5.4 x.1.2.3.5.3	Pan. The WARP shall provide the capability to pan all zoomed satellite,radar, and graphic products.	D	D	X	D	I	D		

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REQ NO.	VOLUME II PARAGRAPH # x = 3.2.1	FAA-E-XXXX PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2049	x.5.1.1.12.4	x.1.2.2.5.5 x.1.2.3.5.4	Animation. The WARP shall provide the capability to display in rapid sequence and chronological order an animation of all graphic, satellite, and radar products.	D	D	X	D	I	D		
2050	x.5.1.1.12.5	x.1.2.2.5 x.1.2.3.5	Combined Functions. The WARP shall have the capability to zoom, pan, and animate radar, satellite, and graphic images, and radar-satellite-graphic overlay images.	D	D	X	D	I	D		
2051	x.5.1.1.12.6	x.1.2.2.5.7 x.1.2.3.5.6	Color. Colors shall be used to individually distinguish display features including:	D	D	X	D	I	D		
2052	x.5.1.1.12.6(a)	x.1.2.2.5.7 x.1.2.3.5.6	Levels of intensity for weather radar;	D	D	X	D	I	D		
2053	x.5.1.1.12.6(b)	x.1.2.2.5.7 x.1.2.3.5.6	Background map features;	D	D	X	D	I	D		
2054	x.5.1.1.12.6(c)	x.1.2.2.5.7 x.1.2.3.5.6	Unique product characteristics (e.g., weather fronts, contours, alphanumerics, et al.).	D	D	X	D	I	D		
2055	x.5.1.1.13	x.1.2.3	Briefing Terminals. In addition to the meteorologist's workstation, the WARP shall provide briefing terminals for supervisors and traffic management specialists.	I	I	I	I	I	I		
2056	x.5.1.1.14		Hardcopy.	L	L	L	L	L	L		Lead-in
2057	x.5.1.1.14.1	x.1.2.2.6	Workstation Hardcopy. The WARP shall provide the capability to produce a color hardcopy of any product displayed at the WARP workstation including overlaid products, without interrupting processing at the WARP.	D	D	X	D	I	D		

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2058	x.5.1.1.14.2	x.1.2.3.6	Briefing Terminal Hardcopy. The WARP shall provide the capability for at least one briefing terminal to produce a color hardcopy of its current product overlay display without interrupting processing at the WARP.	D	D	X	D	I	D		
	x.5.1.1.15		Maintenance Monitoring. The WARP shall:	L	L	L	L	L	L		Lead-in
2059	x.5.1.1.15(a)	x.1.5.1	Monitor its operational status to ensure that it is operating within its proper range;	X	D,A	X	D,A	I	D		
2060	x.5.1.1.15(b)	x.1.5.1.3.2.1	Provide alarms when a failure is detected;	X	T	T	T	I	T		
2061	x.5.1.1.15(c)	x.1.5	Implement the RMS function as specified in Volume I, Appendix III of the NAS-SS-1000.	X	T,A	T,A	D	I	D		
2062	x.5.1.1.16		System Certification. The WARP shall support system certification and test.	X	X	X	X	X	X		Reqt unclear
2063	x.5.1.1.17	x.1.2.4.2.2.1	Adaptation Requests. The WARP shall allow the meteorologist to specify lists of commonly requested products for retrieval, to be able to display and modify these lists, and to be able to generate and/or display a product upon its selection from such a list.	D	D	X	D	I	D		
2064	x.5.1.1.18	x.1.2.4 x.1.6.2.2	Demand Requests. The WARP shall retrieve, generate, and distribute weather products in response to demand requests.	D	D	X	D	I	D		
2065	x.5.1.1.19	3.2.3.4	Standard Time Sources. The WARP shall receive and maintain timing synchronized to coordinated universal time (UTC) to support archiving and data base maintenance.	X	D,A	D,A	D	I	D		

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REQ NO.	VOLUME II PARAGRAPH # x = 3.2.1	FAA-E-XXXX PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
2066	x.5.1.1.20	3.2.8	Growth and Flexibility. The WARP shall provide the capability to disseminate weather radar products to and receive weather data from additional subsystems, to support future interfaces, and to accommodate increased sizes of future forecast gridded fields produced by the NWS. Growth potential will include the capacity for:	X	X	X	X	X	X	Q	Should not be placed in functional characteristics section but possibly in the performance section. End-state NAS requirements are required.
2067	x.5.1.1.20(a)	3.2.8.3.2.1	Building and maintaining a high-resolution, three-dimensional data base of radar reflectivity based on each elevation angle of each NEXRAD scan;	X	X	X	X	X	X	Q	
2068	x.5.1.1.20(b)	3.2.8.3.1	Building and maintaining national grids of flight conditions, including ceiling, visibility, and convective weather impacted airspace;	X	X	X	X	X	X	Q	
2069	x.5.1.1.20(c)	3.2.8.3.1	Maintaining national grids (produced by the NWS) of state-of-the-atmosphere variables and aviation- impact variables with horizontal resolution as fine as 30 km and vertical resolution of up to 50 levels;	X	X	X	X	X	X	Q	
2070	x.5.1.1.20(d)	3.2.8.4.1	Generating horizontal and vertical views of the high-resolution gridded data;	X	X	X	X	X	X	Q	

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2071	x.5.1.1.20(e)	3.2.8.4.2	Providing subsets of its weather data base to selected terminal area weather systems, including portions of grids surrounding terminals within the ACF area, AWOS and ASOS data from the area surrounding the terminals, lightning data for the area surrounding the terminals, and observations from airborne systems for the area surrounding the terminals;	X	X	X	X	X	X	Q	
2072	x.5.1.1.20(f)	3.2.8.4.2	Accepting, displaying, and forwarding to other NAS systems terminal weather depiction products received from terminal area weather systems;	X	X	X	X	X	X	Q	
2073	x.5.1.1.20(g)	3.2.8.4.3 3.2.8.4.4 3.2.8.4.5	Interfacing with future configurations of the Traffic Management System, the Ocean Display and Planning System, and the Flight Service Automation System.	X	X	X	X	X	X	Q	
	x.5.1.2		Performance characteristics.	L	L	L	L	L	L		Title
	x.5.1.2.1		Data Sources. The WARP shall acquire data and/or receive requests:	L	L	L	L	L	L		Lead-in
2074	x.5.1.2.1(a)	x.1.1.1.1	From up to 27 NEXRADs;	X	D,A	D,A	D	I	D	C	
2075	x.5.1.2.1(b)	x.1.1.2 3.2.3.6	From 1 ADAS.;	X	D,A	D,A	D	I	D	C	
2076	x.5.1.2.1(c)	x.1.1.2 x.1.6.2 3.2.3.2	From 1 WMSCR;	X	D,A	D,A	D	I	D	C	
2077	x.5.1.2.1(d)	x.1.1.2 x.1.6.2 3.2.3.1	From 1 ACCC;	X	D,A	D,A	D	I	D	C	
2078	x.5.1.2.1(e)	3.2.8.4.6	From 1 DLP;	X	X	X	X	X	X	Q	

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2079	x.5.1.2.1(f)	3.2.3.3	From 1 MPS;	X	D,A	D,A	D	I	D		
2080	x.5.1.2.1(g)	3.2.3.4	from 1 Coded Time Source;	X	D,A	D,A	D	I	D		
2081	x.5.1.2.1(h)	x.1.6.2 2.2.3.8	From up to 7 WARPs;	X	D,A	D,A	D,A	I	D		
2082	x.5.1.2.1(i)	x.1.6.2 3.2.3.9	From 1 CFWARP;	X	D,A	D,A	D,A	I	D		
2083	x.5.1.2.1(j)	3.2.8.4.2	From up to 6 future NAS Terminal Area Weather Systems.	X	X	X	X	X	X	Q	
	x.5.1.2.2		Request/Reply Response Times.	L	L	L	L	L	L		Lead-in
2084	x.5.1.2.2(a)	x.1.2.5	The WARP shall respond to requests for non-imagery data stored in its data base by accepting the request, retrieving the data, and displaying requested data within 3 seconds mean response time, 5 seconds 99% of the time, and within 10 seconds maximum response time after receipt of the request;	T	T	X	T	I	T		WARP spec requirements are more stringent.
2085	x.5.1.2.2(b)	x.1.2.5	The WARP shall respond to requests for imagery data stored in its data base by retrieving and transferring the data within 5 seconds mean response time, 7 seconds 99% of the time, and within 12 seconds maximum response time after receipt of the request;	T	T	X	T	I	T		WARP spec requirements are more stringent.
2086	x.5.1.2.2(c)	N/A	The WARP shall respond to meteorologist requests for data stored outside its data base by forwarding the request to the external subsystem within 10 seconds after receipt of the request.	X							WARP spec fails to describe this processing and related performance.
	x.5.1.2.3		Processing Time for Generation of Products.	L	L	L	L	L	L		Lead-in

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2087	x.5.1.2.3(a)	x.1.2.5	The WARP shall generate and update weather products based on received data other than gridded data within 30 seconds of receipt of source data;	T	T	X	T	I	T		Performance reqts for the generation of Nat Radar Mosaic, and Satellite products do not meet this NAS reqt.
2088	x.5.1.2.3(b)	x.1.2.5	The WARP shall generate and update weather products based on gridded data within 5 minutes of receipt of source data;	X	T	X	T	I	T		WARP performance reqt for Gridded data does not meet this NAS reqt.
2089	x.5.1.2.3(c)	x.1.2.5	The WARP shall process and update interactively-created weather products within 30 seconds after receipt of data from the meteorologist.	T	T	X	T	I	T		WARP spec requirements are more stringent.
2090	x.5.1.2.4	N/A	Pass-through Processing Time. The WARP shall acquire and transfer hazardous weather products within 10 seconds of receipt of the source data.	X							WARP Spec, fails to specify a performance reqt.
	x.5.1.2.5		Coverage Area for Weather Products.	L	L	L	L	L	L		Lead-in
2091	x.5.1.2.5.1	x.1.1.1.1 x.1.1.1.2 x.1.2.1.1.1.2 x.1.2.1.2.2	The WARP shall acquire and maintain weather radar data for the ACF area, to include a buffer zone extending 150 nm beyond the ACF boundaries.	D,A	D,A	X	D,A	I	D		
2092	x.5.1.2.5.2	x.1.1 x.1.4	The WARP shall acquire and maintain national weather products for the area encompassed by the 48 contiguous states.	D,A	D,A	X	D,A	I	D		

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2093	x.5.1.2.5.3	x.1.1.1.2 x.1.2.1.2.2	The WARP shall acquire and maintain geosynchronous meteorological satellite data covering the oceanic areas for coastal ACFs, including the Anchorage ACF.	D,A	D,A	X	D,A	I	D		
2094	x.5.1.2.5.4	x.1.1.1.2 x.1.2.1.2.2	The Anchorage WARP shall acquire and maintain polar-orbiting meteorological satellite data covering Alaska.	D,A	D,A	X	D,A	I	D		
	x.5.1.2.6		Product Generation and Display. The WARP shall be capable of producing or acquiring and displaying the following types of weather information:	L	L	L	L	L	L		Lead-in
2095	x.5.1.2.6.1	x.1.2.1.6.2	Station model plots. The WARP shall be capable of producing station model plots of surface observations, upper air observations (for a minimum of all mandatory pressure levels) and grid wind and temperature data.	D,A	D,A	X	D,A	I	D		WARP will not generate a model plot of gridded data.
2096	x.5.1.2.6.2	x.1.2.1.6.3	Thermodynamic diagrams and sounding analysis. The WARP shall be capable of producing a vertical thermodynamic diagram for any station for which data is available and for points in received data grids.	D,A	D,A	X	D,A	I	D		WARP will not generate thermo products on gridded data.
2097	x.5.1.2.6.3	x.1.2.1.6.4 x.1.2.1.6.5	Contoured analysis of grid data. The WARP shall provide the meteorologist the capability of objectively analyzing gridded meteorological parameters and contouring the grid data, with the following selectable by the meteorologist:	D,A	D,A	X	D,A	I	D		
2098	x.5.1.2.6.3(a)	x.1.2.1.6.4 x.1.2.1.6.5	Orientation of the analysis: in a horizontal or a vertical plane.	D,A	D,A	X	D,A	I	D		

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2099	x.5.1.2.6.3(b)	x.1.2.1.6.4 x.1.2.1.6.5	Parameters to be contoured.	D,A	D,A	X	D,A	I	D		
2100	x.5.1.2.6.4	x.1.2.1.2.3 x.1.2.2.5.7	Satellite imagery. The WARP shall be capable of displaying satellite imagery with meteorologist-selectable enhancement curves applied.	D,A	D,A	X	D,A	I	D		
	x.5.1.2.7		Workstation requirements.	L	L	L	L	L	L		Lead-in
2101	x.5.1.2.7.1	3.2.4.2.1	Display configuration. The WARP shall provide color monitors supporting presentations of weather graphic products, satellite imagery, and radar displays.	I	I	X	I	I	I		
2102	x.5.1.2.7.1.1	3.2.4.2.1	CWSU display configuration. The WARP shall support an operational position within the CWSU with independently-controlled color monitors providing simultaneous 90-percent-of-full-screen presentations of weather graphic products, satellite imagery, and radar displays.	D,I	I	X	I	I	I		
2103	x.5.1.2.7.1.2	3.2.4.2.2	Briefing terminal display configuration. The WARP shall support up to 15 briefing terminals, each with an independently-controlled color monitor providing a 90-percent-of-full-screen presentation of any weather product.	D,A	D,A	X	D,A	I	D		
2104	x.5.1.2.7.2	x.1.3.4	Alarms/alerts. The WARP shall alert the meteorologist within 15 seconds of receipt of hazardous weather products or warnings, using an aural or visual signal.	X	T	X	T	I	T		

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REQ NO.	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
	x.5.1.2.7.3		Display resolution. The WARP shall display:	L	L	L	L	L	L		Lead-in
2105	x.5.1.2.7.3(a)	x.1.2.1.1.2 x.1.2.1.2.3	Individual satellite images, radar images, or point format data at the resolution received;	D,A	D,A	X	D,A	I	D		
2106	x.5.1.2.7.3(b)	x.1.2.1.1.2	ACF radar mosaics at a resolution of at least 2 km or at the resolution of the NEXRAD output products, whichever is coarser;	X	D,A	X	D,A	I	D		
2107	x.5.1.2.7.3(c)	x.1.2.1.1.2	National radar mosaics at a resolution of 10 km or better.	D,A	D,A	X	D,A	I	D		
2108	x.5.1.2.7.4	x.1.2.2.5.2	Overlay. The WARP shall be capable of displaying the overlay of at least three products (e.g., radar mosaic, satellite, and graphics) in image, contour, and point format, in addition to a background map.	D	D	X	D	I	D		WARP spec does not specify overlay capability for the briefing terminals.
2109	x.5.1.2.7.5	x.1.2.2.5.7 x.1.2.3.5.6	Color. The WARP shall have the capability to display images in operator-selected colors from a palette of 256 colors and 64 gray scales.	D	D	X	D	I	D		WARP Spec does not specify 64 gray scale.
2110	x.5.1.2.7.5.1	x.1.2.2.5.7 x.1.2.3.5.6	Radar reflectivity. The colors for the weather radar reflectivity levels shall be selectable by the meteorologist.	D	D	X	D	I	D		

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REQ NO.	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
2111	x.5.1.2.7.5.2	x.1.2.1.2.3 x.1.2.2.5.7	Satellite imagery. The WARP shall provide the capability for the meteorologist to color-enhance satellite imagery, using a minimum of 32 interactively modifiable enhancement tables, each with up to 24 breakpoints.	D	D	X	D	I	D		WARP Spec fails to specify # of enhancement tables nor the number of break points for each.
2112	x.5.1.2.7.6	x.1.2.2.5.4 x.1.2.3.5.3	Pan. The WARP shall provide the capability to pan any zoomed product between boundaries of the product.	D	D	X	D	I	D		
2113	x.5.1.2.7.7	x.1.2.2.5.3 x.1.2.3.5.2	Zoom. The WARP shall provide the capability to zoom from 1:1 to at least 8:1 magnification with a minimum of two intermediate steps, achieved by retrieving additional data (if available) or by pixel replication:	D	D	X	D	I	D		
2114	x.5.1.2.7.7(a)	x.1.2.2.5.3 x.1.2.3.5.2	Displayed images or point format data products;	D	D	X	D	I	D		
2115	x.5.1.2.7.7(b)	x.1.2.2.5.3 x.1.2.3.5.2	Station model plots which display all data available which will not overlap at any given zoom ratio.	D	D	X	D	I	D		
	x.5.1.2.7.8		Animation. The WARP shall support:	L	L	L	L	L	L		Lead-in
2116	x.5.1.2.7.8(a)	x.1.2.2.5.5 x.1.2.3.5.4	Looping of 90-percent-of-full-screen weather satellite, radar, and graphic products;	D	D	X	D	I	D		
2117	x.5.1.2.7.8(b)	x.1.2.2.5.5	Looping in forward, backward, or reversing forward/backward directions of animation, as selected by the user;	D	D	X	D	I	D		

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REQ NO.	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2118	x.5.1.2.7.8(c)	x.1.2.2.5.5	Looping at speeds from one to at least six frames per second, as selected by the user;	D	D	X	D	I	D		
2119	x.5.1.2.7.8(d)	x.1.2.2.5.5	Looping from 2 to at least 24 frames, as selected by the user;	D	D	X	D	I	D		
2120	x.5.1.2.7.8(e)	x.1.2.2.5.5	Pausing after each animation loop, as selected by the user;	D	D	X	D	I	D		
2121	3.2.1.5.1.2.7.9	x.1.2.4 3.3.7.1.1	Display control. The WARP shall provide the capability to command the display of all weather products, including alphanumeric products, on a color monitor:	D	D	X	D	I	D		
2122	3.2.1.5.1.2.7.9(a)	3.3.7.1.1	Via a short sequence of up to five menu selection actions;	D	D	X	D	I	D		
2123	3.2.1.5.1.2.7.9(b)	3.3.7.1.1	Via a single action, programmable function select;	D	D	X	D	I	D		
2124	3.2.1.5.1.2.7.9(c)	3.3.7.1.1	For a briefing terminal, in a repeated sequence specified by the user, and updated as new data as available;	D	D	X	D	I	D		
2125	3.2.1.5.1.2.7.9(d)	x.1.3.3.1 3.3.7.1.2.2	For a briefing terminal, automatically with an aural or visual signal at the command of the meteorologist.	D	D	X	D	I	D		
	x.5.1.2.8		Data Retention.	L	L	L	L	L	L		Lead-in WARP spec exceeds NAS reqts.
2126	x.5.1.2.8(a)	x.1.4.2.1.4	The WARP shall accumulate and maintain individual PIREPS for a minimum of 3 hours after the time of the phenomena or time of transmission if no time of phenomena is available.	D,A	D,A	X	D,A	I	D		

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REQ NO.	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
2127	x.5.1.2.8(b)	x.1.4.2.1.4	The WARP shall accumulate and maintain all hourly and special surface observations for a minimum of 12 hours after time of receipt	D,A	D,A	X	D,A	I	D		
2128	x.5.1.2.8(c)	x.1.4.2.1.4	The WARP shall accumulate and maintain all terminal forecast for a minimum of 30 hours after time of receipt.	D,A	D,A	X	D,A	I	D		
2129	x.5.1.2.8(d)	x.1.4.2.1.4	The WARP shall accumulate and maintain area forecasts for a minimum of 30 hours after time of receipt.	D,A	D,A	X	D,A	I	D		
2130	x.5.1.2.8(e)	x.1.4.2.1.5	The WARP shall accumulate and maintain wind and temperature forecasts (surface and aloft) for a minimum of 30 hours after time of receipt.	D,A	D,A	X	D,A	I	D		
2131	x.5.1.2.8(f)	x.1.4.2.1.4	The WARP shall accumulate and maintain weather advisories,warnings,and impact statements until cancelled or for a minimum of 12 hours after time of receipt.	D,A	D,A	X	D,A	I	D		
2132	x.5.1.2.8(g)	x.1.4.2.1.1	The WARP shall provide the meteorologist the capability to selectively accumulate and maintain a minimum of 48 versions of each radar image or mosaic map (24 versions for the national radar mosaic).	D,A	D,A	X	D,A	I	D		National mosaic product only for OCD.
2133	x.5.1.2.8(h)	x.1.4.2.1.2	Provide the meteorologist the capability to selectively accumulate and maintain a minimum of 24 versions of each satellite image;	D,A	D,A	X	D,A	I	D		
2134	x.5.1.2.8(i)	x.1.4.2.1.4 x.1.4.2.1.6	The WARP shall maintain meteorologist generated products until manually cancelled or 30 hours after time of generation, whichever is first.	D,A	D,A	X	D,A	I	D		
2135	x.5.1.2.8(j)	x.1.4.2.1.3	Accumulate and maintain lightning data for a minimum of 2 hours after time of receipt.	D,A	D,A	X	D,A	I	D		

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REQ NO.	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
	x.5.1.2.9		Archiving.	L	L	L	L	L	L		Lead-in
2136	x.5.1.2.9(a)	x.1.4.3.1	The WARP shall archive for 15 days all products created by the WARP or meteorologist that are generated and disseminated to external NAS Subsystems.	X	D,A	X	D,A	I	D		"...and disseminated. .." should be changed to "...or disseminated"
2137	x.5.1.2.9(b)	x.1.4.3.1.1	The WARP shall archive for 15 days a journal, created by the WARP, of all products accepted by the WARP.	X	D,A	X	D,A	I	D		
	x.5.1.2.10		Data Destinations.	L	L	L	L	L	L		Lead-in
2138	x.5.1.2.10(a)	x.1.6 3.2.3.1	The WARP shall disseminate data or requests to 1 ACCC.	X	D,A	D,A	D,A	I	D	C	
2139	x.5.1.2.10(b)	x.1.6 3.2.3.2	The WARP shall disseminate data or requests to 1 WMSCR.	X	D,A	D,A	D,A	I	D		
2140	x.5.1.2.10(c)	3.2.8.4.6	The WARP shall disseminate data or requests to 1 DLP.	X	X	X	X	X	X	Q	
2141	x.5.1.2.10(d)	3.2.3.3	The WARP shall disseminate data or requests to 1 MPS.	X	D,A	D,A	D,A	I	D		
2142	x.5.1.2.10(e)	x.1.6.2.2	The WARP shall disseminate data or requests to up to 27 NEXRADs.	X	D,A	D,A	D,A	I	D		
2143	x.5.1.2.10(f)	x.1.6.2.2	The WARP shall disseminate data or requests up to 7 WARPs.	X	D,A	D,A	D,A	X	D,A		
2144	x.5.1.2.10(g)	x.1.6.2.1 x.1.6.2.2	The WARP shall disseminate data or requests to 1 CFWARP.	X	D,A	D,A	D,A	I	D		
2145	x.5.1.2.10(h)	3.2.8.4.2	The WARP shall disseminate data or requests up to 6 future NAS terminal area weather systems.	X	X	X	X	X	X	Q	

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REQ NO.	VOLUME II PARAGRAPH # x = 3.2.1	FAA-E-XXXX PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2146	x.5.1.2.11	x.1.6 3.2.3	Communications load. The WARP shall have the data capacity to handle the data sources and destinations with peak data rates as described in Table 3.2.1.5.1.3-1.	I,A	I,A	I,A	I,A	I	I		
2147	x.5.1.2.12	3.3.11.5	Output capacity. The WARP shall have a data capacity margin of 100 percent.	I,A	I,A	I,A	I,A	I	I		WARP spec reqt exceeds this reqt.
2148	x.5.1.2.13	x.1.4	Storage capacity. The WARP shall have the capacity to store all retained products at the maximum resolution available from the data source.	I,A	I,A	I,A	I,A	I	I		
2149	x.5.1.2.14	3.2.3.4	Standard time reference. The WARP shall synchronize to the NAS standard time reference in accordance with 3.2.1.2.8.4 in Volume I of NAS-SS-1000. The WARP shall be capable of 1-second timing resolution.	X	D,A	D,A	D,A	I	D		
2150	x.5.1.2.15	X.1.5	Maintenance monitoring. The WARP shall meet the maintenance monitoring performance characteristics listed in 3.2.1.1.1.2 of Volume V of NAS-SS-1000 and as specified in 30.1.2 Volume I Appendix III of NAS-SS-1000.	X	L	L	L	L	L		
2151	x.5.1.3	3.2.3	Functional/physical interfaces. The WARP shall interface functionally and physically as shown in Figure 3.2.1.5.1.3-1. The WARP functional interfaces are defined in Table 3.2.1.5.1.3-1.	X	D,A	D,A	D,A	I	D	C	
REQUIREMENTS FOR CFWARP											

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REQ NO	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
	x.5.9		Central Flow Weather and Radar Processor (CFWARP). The CFWARP shall provide the processing support to automatically receive, process, produce, and disseminate weather products to support ATC personnel and meteorologists. The CFWARP will provide interactive display workstation support for the Central Flow Weather Service Unit (CFWSU) meteorologists to generate, display, annotate, and disseminate weather products. The CFWARP will also provide color terminals for use by ATCCC supervisors and traffic management specialists to display weather products.	L	L	L	L	L	L		Lead-in
	x.5.9.1		Functional characteristics. The CFWARP shall provide the following functions:	L	L	L	L	L	L		Lead-in
	x.5.9.1.1		Data collection. The CFWARP shall accept the following information:	L	L	L	L	L	L		Lead-in
2152	x.5.9.1.1.1	x.1.1.2 x.1.6.2.1 x.1.6.2.2	Weather radar products. The CFWARP shall accept processed NEXRAD weather radar image data.	X	D,A	D,A	D,A	I	D		
2153	x.5.9.1.1.2	x.1.1.1.4 x.1.1.2	Alphanumeric Products. The CFWARP shall accept alphanumeric products generated by external agencies (e.g. NWS, DOD), Pilot Weather Reports (PIREPs), surface observations, and products generated at WARP locations.	X	D	X	D	I	D		

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REQ NO.	VOLUME II PARAGRAPH # x = 3.2.1	FAA-E-XXXX PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
2154	x.5.9.1.1.3	x.1.1.1.5 x.1.1.2	Binary Data. The CFWARP shall accept binary encoded weather products generated by external agencies(e.g., NWS) and other NAS subsystems.	D	D	D	D	I	D		For OCDs, receipt of binary data form other NAS subsystems does not apply
	x.5.9.1.1.4		Meteorological Satellite Imagery. The CFWARP shall accept:	L	L	L	L	L	L		Lead-in
2155	x.5.9.1.1.4(a)	x.1.1.1.2	Geosynchronous meteorological satellite imagery including imagery from visible, infrared, and moisture channels;	D	D,A	X	D	I	D		
2156	x.5.9.1.1.4(b)	x.1.1.1.2	Polar orbiter meteorological satellite imagery covering Alaska.	D	D,A	X	D	I	D		
2157	x.5.9.1.1.5	x.1.1.1.6	Graphic Weather Data. The CFWARP shall accept graphic weather data from the NWS and products generated at WARP locations.	X	D	D	D	I	D		
2158	x.5.9.1.1.6	x.1.1.1.3	Lightning Data. The CFWARP shall accept lightning data from other sources (e.g., NWS, vendors).	D	D	D	D	I	D		
2159	x.5.9.1.1.7	x.1.2.1.6.1 x.1.2.4.1.1 x.1.2.4.1.2	Meteorologist data. The CFWARP shall accept alphanumeric and graphic weather products input by the meteorologist.	D	D	D	D	I	D		
2160	x.5.9.1.1.8	3.2.1.1.2.4.2	Data requests. The CFWARP shall accept and process requests from users for weather products.	X	D,A	D,A	D	I	D	C	

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REQ NO.	VOLUME II PARAGRAPH # x=3 2 1	FAA-E-XXXX PARAGRAPH # x=3 2 1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2161	x 5 9 1 2	x 1 6	Data distribution. The CFWARP shall routinely distribute weather products to external NAS subsystems,CWSU meteorologists, and briefing terminal users in accordance with table 3 2 1.5.9 3-1.	X	D,A	D,A	D	I	D	C	
	x.5 9.1 3		Display Products. The CFWARP shall provide data to CFWARP users as follows:	L	L	L	L	L	L		Lead-in
	x 5.9.1.3 1		Area/line Depiction. The CFWARP shall provide displays depicting the following weather data to illustrate the area of a weather phenomenon's occurrence or lines along which weather parameters have equal values.	L	L	L	L	L	L		Lead-in
2162	x 5 9 1 3 1(a)	x.1 2 1 1	NEXRAD radar data in image format, including ACF area mosaics for any ACF.	D	D,A	X	D	I	D	C	Does not address National radar Mosaics.
2163	x 5 9 1 3 1(b)	x 1 2 1 3 2 x.1 2 1 6 2 4	Surface observation and lightning data in vector or point format;	D	D,A	X	D	I	D		
2164	x 5 9.1 3 1(c)	x.1 2.1 6 2.4	Upper air observation or forecast data in vector or point format;	D	D.A	X	D	I	D		
2165	x.5 9 1.3.1(d)	x.1 2.1 2	Meteorological satellite images.	D	D.A	X	D	I	D		
	x.5.9.1.3.2		Data Plots. The CFWARP shall plot the following weather data to depict horizontal and/or vertical views of:	L	L	L	L	L	L		Lead-in
2166	x.5.9.1.3 2(a)	x.1 2.1.3 x.1 2.1.6 2.2	Surface observation and lightning data (horizontal view);	D	D,A	X	D	I	D		

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REQ NO	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2167	x.5.9.1.3.2(b)	x.1.2.1.6.2.2	Upper air observation data;	D	D,A	X	D	I	D		
2168	x.5.9.1.3.2(c)	x.1.2.1.6	NWS, ICAO, and DOD alphanumeric products;	D	D,A	X	D	I	D		
2169	x.5.9.1.3.2(d)	x.1.2.1.5 x.1.2.1.6.4.1 x.1.2.1.6.5.1	Gridded data from external sources (e.g., DOD, NWS);	D	D,A	X	D	I	D		
2170	x.5.9.1.3.2(e)	x.1.2.1.6.6	PIREPs (horizontal view).	D	D,A	X	D	I	D		
	x.5.9.1.4		Alphanumeric Products. The CFWARP shall automatically generate the following weather products for display or dissemination:	L	L	L	L	L	L		Lead-in
2171	x.5.9.1.4(a)	x.1.2.1.4.1	Surface observation reformatted report;	X	D,A	D,A	D	I	D	C	
2172	x.5.9.1.4(b)	x.1.2.1.4.1	Terminal forecast reformatted report;	X	D,A	D,A	D	I	D	C	
2173	x.5.9.1.4(c)	x.1.2.1.5	Grid winds and temperatures forecast reformatted report	X	D,A	D,A	D	I	D	C	
2174	x.5.9.1.5	x.1.2.1.6.1 x.1.2.4.1	Interactively Created Products. The CFWARP shall provide the meteorologist with the capability to interactively create alphanumeric and graphic products for display or dissemination including, but not limited to:	D	D	D,A	D	I	D	C	
2175	x.5.9.1.5(a)	x.1.2.4.1.1	General Information Messages;	D	D	D,A	D	I	D	C	
2176	x.5.9.1.5(b)	x.1.2.4.1.1	Center Weather Advisories;	D	D	D,A	D	I	D	C	
2177	x.5.9.1.5(c)	x.1.2.4.1.1	Meteorological Impact Statements;	D	D	D,A	D	I	D	C	
2178	x.5.9.1.5(d)	x.1.2.4.1.2	Hazardous Weather Outline;	D	D	D,A	D	I	D	C	
2179	x.5.9.1.6	x.1.4.2	Updating. The CFWARP shall update its data base and generated products to reflect current data from all data sources.	D,A	D,A	D,A	D	I	D		

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REQ NO	VOLUME II PARAGRAPH # x = 3 2 1	FAA-E-XXXX PARAGRAPH # x = 3 2 1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
	x 5 9 1 7		Weather Alerts. The CFWARP shall alert the meteorologist to:	L	L	L	L	L	L		Lead-in
2180	x 5 9 1 7(a)	x.1.3.1 2	Hazardous weather conditions in surface observation or terminal forecast products;	X	D	X	D	I	D		
2181	x.5 9.1.7(b)	x.1 3.1.1	Receipt of hazardous weather products and urgent PIREPs.	X	D	X	D	I	D		
2182	x 5 9 1.7(c)	x.1 3.1.2	Receipt of NEXRAD data meeting adaptable parameters, such as reflectivity, turbulence, and echo tops in an adaptable number of grid cells in an adaptable area, or adaptable values of hail index, mesocyclone, tornado vortex signature, or severe weather probability.	X	D	X	D	I	D		
2183	x 5 9 1 8	x.1.4 2	Data base. The CFWARP shall maintain a data base of all received and generated products.	A	A	X	A	I	A		
2184	x 5 9 1 9	x 1 4 3	Archiving. The CFWARP shall archive all products created by the CFWARP or meteorologist that are generated or disseminated to external NAS subsystems.	D	D.A	X	D.A	I	D.A	C	For products created by the system or user for OCD.
	x 5 9 1 10		Manual Input. The CFWARP shall accept the following inputs from the users:	L	L	L	L	L	L		Lead-in
2185	x 5 9.1.11(a)	x.1.2.4	Adaptation or demand requests for weather products;	D	D	X	D	I	D		
2186	x 5 9 1.11(b)	x.1.2 4	New product data;	D	D	X	D	I	D		
2187	x.5 9.1.11(c)	x.1.2 4	Display commands;	D	D	X	D	I	D		
2188	x.5 9.1.11(d)	x.1.2.4	From meteorologists, alphanumeric and graphic annotations to existing products;	D	D	X	D	I	D		

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REQ NO.	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
2189	x.5.9.1.11(e)	x.1.2.4.3	From meteorologists, adaptation of weather data parameters for alerts.	D	D	X	D	I	D		
2190	x.5.9.1.11	x.1.2.2.1 x.1.2.3.1	Product Display. The CFWARP shall be capable of displaying on color graphics display monitors all products that it can receive or generate.	D	D	X	D	I	D		
2191	x.5.9.1.1.11.1	x.1.2.2.5.2	Overlay. The CFWARP shall provide for overlaying graphic, satellite, and radar image products for display at the same scale and projection.	D	D	X	D	I	D		
2192	x.5.9.1.11.2	x.1.2.2.5.3 x.1.2.3.5.2	Zoom. The CFWARP shall provide the capability to zoom all satellite, radar, and graphic products	D	D	X	D	I	D		
2193	x.5.9.1.11.3	x.1.2.2.5.4 x.1.2.3.5.3	Pan. The CFWARP shall provide the capability to pan all zoomed satellite,radar, and graphic products.	D	D	X	D	I	D		
2194	x.5.9.1.11.4	x.1.2.2.5.5 x.1.2.3.5.4	Animation. The CFWARP shall provide the capability to display in rapid sequence and chronological order an animation of all graphic, satellite, and radar products.	D	D	X	D	I	D		
2195	x.5.9.1.11.5	x.1.2.2.5 x.1.2.3.5	Combined Functions. The CFWARP shall have the capability to zoom, pan, and animate radar, satellite, and graphic images, and radar-satellite-graphic overlay images.	D	D	X	D	I	D		
2196	x.5.9.1.11.6	x.1.2.2.5.7 x.1.2.3.5.6	Color. Colors shall be used to individually distinguish display features including:	D	D	X	D	I	D		

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REQ NO	VOLUME II PARAGRAPH # x = 3 2 1	FAA-E-XXXX PARAGRAPH # x = 3 2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2197	x 5 9 1 11 6(a)	x 1 2 2 5 7 x.1 2 3 5 6	Levels of intensity for weather radar;	D	D	X	D	I	D		
2198	x.5 9 1.11 6(b)	x.1 2 2 5 7 x.1 2 3 5 6	Background map features;	D	D	X	D	I	D		
2199	x.5 9.1 11 6(c)	x.1 2 2 5 7 x.1 2 3 5 6	Unique product characteristics (e.g., weather fronts, contours, alphanumerics, et al.).	D	D	X	D	I	D		
2200	x.5 9.1.12	x.1.2.3	Briefing Terminals. In addition to the meteorologist's workstation, the CFWARP shall provide briefing terminals for supervisors and traffic management specialists.	I	I	I	I	I	I		
2201	x.5 9 1 13		Hardcopy.	L	L	L	L	L	L		Lead-in
2202	x 5 9 1.13 1	x.1.2.2 6	Workstation Hardcopy. The CFWARP shall provide the capability to produce a color hardcopy of any product displayed at the CFWARP workstation including overlaid products, without interrupting processing at the CFWARP	D	D	X	D	I	D		
2203	x.5 9 1.13 2	x.1.2.3 6	Briefing Terminal Hardcopy. The CFWARP shall provide the capability for at least two briefing terminal to produce a color hardcopy of its current product overlay display without interrupting processing at the CFWARP.	D	D	X	D	I	D		
	x.5 9.1.14		Maintenance Monitoring. The CFWARP shall:	L	L	L	L	L	L		Lead-in
2204	x.5 9.1.14(a)	x.1.5.1	Monitor its operational status to ensure that it is operating within its proper range;	X	D,A	X	D,A	I	D		
2205	x.5.9 1 14(b)	x.1.5 1 3.2 1	Provide alarms when a failure is detected;	X	T	T	T	I	T		

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REQ NO.	VOLUME II PARAGRAPH # x=3 2 1	FAA-E-XXXX PARAGRAPH # x=3 2 1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2206	x 5 9 1 14(c)	x 1 5	Implement the RMS function as specified in Volume I, Appendix III of the NAS-SS-1000.	X	T,A	T,A	D	I	D		
2207	x 5 9 1 15		System Certification. The CFWARP shall support system certification and test.	X	X	X	X	X	X		Reqt unclear
2208	x 5 9 1 16	x.1.2 4 2 2.1	Adaptation Requests. The CFWARP shall allow the meteorologist to specify lists of commonly requested products for retrieval, to be able to display and modify these lists, and to be able to generate and/or display a product upon its selection from such a list.	D	D	X	D	I	D		
2209	x.5 9 1 17	x.1 2 4 x.1 6.2.2	Demand Requests. The CFWARP shall retrieve, generate, and distribute weather products in response to demand requests.	D	D	X	D	I	D		
2210	x 5 9 1 18	3.2.3.4	Standard Time Sources. The CFWARP shall receive and maintain timing synchronized to coordinated universal time (UTC) to support archiving and data base maintenance.	X	D,A	D,A	D	I	D		

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REQ NO	VOLUME II PARAGRAPH # x = 3 2 1	FAA-E-XXXX PARAGRAPH # x = 3 2 1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2211	x.5 9 1 19	3 2 8	Growth and Flexibility. The CFWARP shall provide the capability to disseminate weather radar products to and receive weather data from additional subsystems, to support future interfaces, and to accommodate increased sizes of future forecast gridded fields produced by the NWS. Growth potential will include the capacity for:	X	X	X	X	X	X	Q	Should not be placed in functional characteristics section but possibly in the performance section. End-state NAS requirements are required.
2212	x.5 9 1 19(a)	3.2 8 3 1	Building and maintaining national grids of flight conditions, including ceiling, visibility, and convective weather impacted airspace;	X	X	X	X	X	X	Q	
2213	x.5 9 1 19(b)	3 2 8 3 1	Maintaining national grids (produced by the NWS) of state-of-the-atmosphere variables and aviation- impact variables with horizontal resolution as fine as 30 km and vertical resolution of up to 50 levels;	X	X	X	X	X	X	Q	
2214	x.5 9 1 19(c)	3.2 8 4 1	Generating horizontal and vertical views of the high-resolution gridded data;	X	X	X	X	X	X	Q	
2215	x.5 9 1 19(d)	3.2 8 4 3	Interfacing with future configurations of the Traffic Management System.	X	X	X	X	X	X	Q	
	x 5 9 2		Performance characteristics.	L	L	L	L	L	L		Title
	x.5 9 2 1		Data Sources. The CFWARP shall acquire data and/or receive requests:	L	L	L	L	L	L		Lead-in
2216	x.5 9 2 1(a)	x.1.1.2 x.1.6 2 3 2 3 2	From 1 WMSCR;	X	D,A	D,A	D	I	D	C	

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REQ NO.	VOLUME II PARAGRAPH # x = 3.2.1	FAA-E-XXXX PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2217	x.5.9.2.1(b)	3.2.3.3	From 1 MPS;	X	D,A	D,A	D	I	D		
2218	x.5.9.2.1(c)	x.1.6.2 2.2.3.8	From 21 WARPs;	X	D,A	D,A	D,A	I	D	C	
2219	x.5.9.2.1(d)	3.2.3.4	from 1 Coded Time Source;	X	D,A	D,A	D	I	D		
	x.5.9.2.2		Request/Reply Response Times.	L	L	L	L	L	L		Lead-in
2220	x.5.9.2.2(a)	x.1.2.5	The WARP shall respond to requests for non-imagery data stored in its data base by accepting the request, retrieving the data, and displaying requested data within 3 seconds mean response time, 5 seconds 99% of the time, and within 10 seconds maximum response time after receipt of the request;	T	T	X	T	I	T		WARP spec requirements are more stringent.
2221	x.5.9.2.2(b)	x.1.2.5	The WARP shall respond to requests for imagery data stored in its data base by retrieving and transferring the data within 5 seconds mean response time, 7 seconds 99% of the time, and within 12 seconds maximum response time after receipt of the request;	T	T	X	T	I	T		WARP spec requirements are more stringent.
2222	x.5.9.2.2(c)	N/A	The WARP shall respond to meteorologist requests for data stored outside its data base by forwarding the request to the external subsystem within 10 seconds after receipt of the request.	X							WARP spec fails to describe this processing and related performance.
	x.5.9.2.3		Processing Time for Generation of Products.	L	L	L	L	L	L		Lead-in

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REQ NO	VOLUME II PARAGRAPH # x = 3 2 1	FAA-E-XXXX PARAGRAPH # x = 3 2 1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2223	x 5 9 2 3(a)	x.1 2 5	The WARP shall generate and update weather products based on received data other than gridded data within 30 seconds of receipt of source data;	T	D A	X	D.A	I	D		Performance reqts for the generation of Nat Radar Mosaic, and Satellite products do not meet this NAS reqt.
2224	x.5 9 2 3(b)	x.1.2.5	The WARP shall generate and update weather products based on gridded data within 5 minutes of receipt of source data;	X	T	X	T	I	T		WARP performance reqt for Gridded data does not meet this NAS reqt.
2225	x.5 9 2 3(c)	x.1.2 5	The WARP shall process and update interactively-created weather products within 30 seconds after receipt of data from the meteorologist.	T	T	X	T	I	T		WARP spec requirements are more stringent.
2226	x.5 9 2 4	N/A	Pass-through Processing Time. The WARP shall acquire and transfer hazardous weather products within 10 seconds of receipt of the source data.	X							WARP Spec, fails to specify a performance reqt.
	x.5 9 2 5		Coverage Area for Weather Products.	L	L	L	L	L	L		Lead-in
2227	x.5 9 2.5.1	x.1.1 x.1.4	The CFWARP shall acquire and maintain national weather products for the area encompassed by the 48 contiguous states.	D,A	D,A	X	D,A	I	D		
2228	x.5.9.2.5.2	x.1.1.1.1 x.1.1.1.2 x.1.2.1.1.1.2 x.1.2.1.2.2	The CFWARP shall acquire and maintain weather products for any ACF area as required.	D,A	D,A	X	D,A	I	D		

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REQ NO	VOLUME II PARAGRAPH # x = 3 2 1	FAA-E-XXXX PARAGRAPH # x = 3 2 1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
2229	x 5 9 2 5 3	x 1 1 1 2 x.1 2.1.2.2	The CFWARP shall acquire and maintain geosynchronous meteorological satellite data covering the oceanic areas and polar-orbiting meteorological satellite data covering Alaska.	D,A	D.A	X	D,A	I	D		
	x 5 9 2 6		Product Generation and Display. The CFWARP shall be capable of producing or acquiring and displaying the following types of weather information:	L	L	L	L	L	L		Lead-in
2230	x 5 9 2 6 1	x.1.2.1 6 2	Station model plots. The CFWARP shall be capable of producing station model plots of surface observations, upper air observations (for a minimum of all mandatory pressure levels) and grid wind and temperature data.	D.A	D.A	X	D.A	I	D		WARP will not generate a model plot of gridded data.
2231	x 5 9 2 6 2	x.1.2.1 6 3	Thermodynamic diagrams and sounding analysis. The CFWARP shall be capable of producing a vertical thermodynamic diagram for any station for which data is available and for points in received data grids	D.A	D.A	X	D,A	I	D		WARP will not generate thermo products on gridded data.
2232	x 5 9 2 6 3	x 1 2 1 6 4 x 1.2.1 6 5	Contoured analysis of grid data. The CFWARP shall provide the meteorologist the capability of objectively analyzing gridded meteorological parameters and contouring the grid data, with the following selectable by the meteorologist:	D.A	D A	X	D.A	I	D		
2233	x 5 9 2.6 3(a)	x 1.2.1 6.4 x.1.2 1 6 5	Orientation of the analysis: in a horizontal or a vertical plane.	D.A	D.A	X	D.A	I	D		
2234	x 5 9 2.6 3(b)	x.1.2.1 6 4 x.1.2.1 6.5	Parameters to be contoured.	D,A	D.A	X	D A	I	D		

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2235	x 5 9 2 6 4	x 1 2 1 2 3 x 1 2 2 5 7	Satellite imagery. The CFWARP shall be capable of displaying satellite imagery with meteorologist-selectable enhancement curves applied.	D,A	D,A	X	D,A	I	D		
	x 5 9 2 7		Workstation requirements.	L	L	L	L	L	L		Lead-in
2236	x 5 9 2 7 1	3 2 4 2 1	Display configuration. The CFWARP shall provide color monitors supporting presentations of weather graphic products, satellite imagery, and radar displays.	I	I	X	I	I	I		
2237	x 5 9 2 7 1 1	3 2 4 2 1	CWSU display configuration. The CFWARP shall support two operational positions within the CFWSU, each with independently-controlled color monitors providing simultaneous 90-percent-of-full-screen presentations of weather graphic products, satellite imagery, and radar displays.	D,I	I	X	I	I	I		
2238	x 5 9 2 7 1 2	3 2 4 2 2	Briefing terminal display configuration. The CFWARP shall support up to 5815 briefing terminals, each with an independently-controlled color monitor providing a 90-percent-of-full-screen presentation of any weather product.	D,A	D,A	X	D,A	I	D		
2239	x 5 9 2 7 2	x 1 3 4	Alarms/alerts. The CFWARP shall alert the meteorologist within 15 seconds of receipt of hazardous weather products or warnings, using an aural or visual signal.	X	T	X	T	I	T		
	x 5 9 2 7 3		Display resolution. The CFWARP shall display:	L	L	L	L	L	L		Lead-in

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NAS-SS-1000 VOLUME II REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO.	VOLUME II PARAGRAPH # x=3 2 1	FAA-E-XXXX PARAGRAPH # x=3 2 1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2240	x 5 9 2 7 3(a)	x 1 2 1 1 2 x.1 2 1.2.3	Individual satellite images, radar images, or point format data at the resolution received;	D,A	D,A	X	D,A	I	D		
2241	x.5 9 2 7 3(b)	x.1 2.1.1 2	ACF radar mosaics at a resolution of at least 2 km or at the resolution of the NEXRAD output products, whichever is coarser;	X	D,A	X	D,A	I	D		
2242	x.5 9 2 7 3(c)	x 1 2.1.1 2	National radar mosaics at a resolution of 10 km or better.	D,A	D,A	X	D,A	I	D		
2243	x.5 9 2 7 4	x.1.2.2.5.2	Overlay. The CFWARP shall be capable of displaying the overlay of at least three products (e.g., radar mosaic, satellite, and graphics) in image, contour, and point format, in addition to a background map.	D	D	X	D	I	D		WARP spec does not specify overlay capability for the briefing terminals.
2244	x 5 9 2 7 5	x 1.2 2 5 7 x.1.2 3 5.6	Color. The CFWARP shall have the capability to display images in operator-selected colors from a palette of 256 colors and 64 gray scales.	D	D	X	D	I	D		WARP Spec does not specify 64 gray scale.
2245	x.5.9 2 7 5.1	x 1 2.2 5 7 x.1.2.3.5.6	Radar reflectivity. The colors for the weather radar reflectivity levels shall be selectable by the meteorologist.	D	D	X	D	I	D		
2246	x.5.9 2 7.5 2	x.1.2.1.2.3 x.1.2.2.5.7	Satellite imagery. The CFWARP shall provide the capability for the meteorologist to color-enhance satellite imagery, using a minimum of 32 interactively modifiable enhancement tables, each with up to 24 breakpoints.	D	D	X	D	I	D		WARP Spec fails to specify # of enhancement tables nor the number of break points for each.

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NAS-SS-1000 VOLUME II REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO	VOLUME II PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2247	x.5.9.2.7.6	x.1.2.2.5.4 x.1.2.3.5.3	Pan. The CFWARP shall provide the capability to pan any zoomed product between boundaries of the product.	D	D	X	D	I	D		
2248	x.5.9.2.7.7	x.1.2.2.5.3 x.1.2.3.5.2	Zoom. The CFWARP shall provide the capability to zoom from 1:1 to at least 8:1 magnification with a minimum of two intermediate steps, achieved by retrieving additional data (if available) or by pixel replication:	D	D	X	D	I	D		
2249	x.5.9.2.7.7(a)	x.1.2.2.5.3 x.1.2.3.5.2	Displayed images or point format data products;	D	D	X	D	I	D		
2250	x.5.9.2.7.7(b)	x.1.2.2.5.3 x.1.2.3.5.2	Station model plots which display all data available which will not overlap at any given zoom ratio.	D	D	X	D	I	D		
	x.5.9.2.7.8		Animation. The CFWARP shall support:	L	L	L	L	L	L		Lead-in
2251	x.5.9.2.7.8(a)	x.1.2.2.5.5 x.1.2.3.5.4	Looping of 90-percent-of-full-screen weather satellite, radar, and graphic products;	D	D	X	D	I	D		
2252	x.5.9.2.7.8(b)	x.1.2.2.5.5	Looping in forward, backward, or reversing forward/backward directions of animation, as selected by the user;	D	D	X	D	I	D		
2253	x.5.9.2.7.8(c)	x.1.2.2.5.5	Looping at speeds from one to at least six frames per second, as selected by the user;	D	D	X	D	I	D		
2254	x.5.9.2.7.8(d)	x.1.2.2.5.5	Looping from 2 to at least 24 frames, as selected by the user;	D	D	X	D	I	D		
2255	x.5.9.2.7.8(e)	x.1.2.2.5.5	Pausing after each animation loop, as selected by the user;	D	D	X	D	I	D		

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NAS-SS-1000 VOLUME II REQUIREMENTS				VERIFICATION LEVEL AND METHOD						REQ STAT	REMARKS
REQ NO	VOLUME II PARAGRAPH # x=3 2 1	FAA-E-XXXX PARAGRAPH # x=3 2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
2256	3 2 1 5 1 2 7 9	x 1 2 4 3 3 7 1 1	Display control The CFWARP shall provide the capability to command the display of all weather products, including alphanumeric products, on a color monitor:	D	D	X	D	I	D		
2257	3.2.1.5 1.2 7 9(a)	3.3.7.1.1	Via a short sequence of up to five menu selection actions;	D	D	X	D	I	D		
2258	3.2.1.5.1 2.7 9(b)	3.3.7 1.1	Via a single action, programmable function select;	D	D	X	D	I	D		
2259	3.2.1.5.1.2 7.9(c)	3.3.7 1 1	For a briefing terminal, in a repeated sequence specified by the user, and updated as new data as available;	D	D	X	D	I	D		
2260	3.2.1.5 1.2 7 9(d)	x.1.3.3 1 3.3.7 1.2.2	For a briefing terminal, automatically with an aural or visual signal at the command of the meteorologist.	D	D	X	D	I	D		
	x.5 9 2 8		Data Retention	L	L	L	L	L	L		Lead-in WARP spec exceeds NAS reqts.
2261	x 5 9 2 8(a)	x 1.4 2 1.4	The CFWARP shall accumulate and maintain individual PIREPS for a minimum of 3 hours after the time of the phenomena or time of transmission if no time of phenomena is available.	D,A	D,A	X	D,A	I	D		
2262	x.5 9.2 8(b)	x.1.4.2.1.4	The CFWARP shall accumulate and maintain all hourly and special surface observations for a minimum of 12 hours after time of receipt	D,A	D,A	X	D,A	I	D		
2263	x.5 9 2 8(c)	x.1 4 2.1 4	The CFWARP shall accumulate and maintain all terminal forecast for a minimum of 30 hours after time of receipt	D.A	D.A	X	D.A	I	D		

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NAS-SS-1000 VOLUME II REQUIREMENTS				VERIFICATION LEVEL AND METHOD						REQ STAT	REMARKS
REQ NO	VOLUME II PARAGRAPH # x=3 2 1	FAA-E-XXXX PARAGRAPH # x=3 2 1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
2264	x.5.9.2.8(d)	x.1.4.2.1.4	The CFWARP shall accumulate and maintain area forecasts for a minimum of 30 hours after time of receipt.	D,A	D,A	X	D,A	I	D		
2265	x.5.9.2.8(e)	x.1.4.2.1.5	The CFWARP shall accumulate and maintain wind and temperature forecasts (surface and aloft) for a minimum of 30 hours after time of receipt.	D,A	D,A	X	D,A	I	D		
2266	x.5.9.2.8(f)	x.1.4.2.1.4	The CFWARP shall accumulate and maintain weather advisories,warnings,and impact statements until cancelled or for a minimum of 12 hours after time of receipt.	D,A	D,A	X	D,A	I	D		
2267	x.5.9.2.8(g)	x.1.4.2.1.1	The CFWARP shall provide the meteorologist the capability to selectively accumulate and maintain a minimum of 48 versions of each radar image or mosaic map (24 versions for the national radar mosaic).	D,A	D,A	X	D,A	I	D		
2268	x.5.9.2.8(h)	x.1.4.2.1.2	Provide the meteorologist the capability to selectively accumulate and maintain a minimum of 24 versions of each satellite image;	D,A	D,A	X	D,A	I	D		
2269	x.5.9.2.8(i)	x.1.4.2.1.4 x.1.4.2.1.6	The CFWARP shall maintain meteorologist generated products until manually cancelled or 30 hours after time of generation, whichever is first.	D,A	D,A	X	D,A	I	D		
2270	x.5.9.2.8(j)	x.1.4.2.1.3	Accumulate and maintain lightning data for a minimum of 2 hours after time of receipt.	D,A	D,A	X	D,A	I	D		
	x.5.9.2.9		Archiving.	L	L	L	L	L	L		Lead-in

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NAS-SS-1000 VOLUME II REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO.	VOLUME II PARAGRAPH # x = 3 2 1	FAA-E-XXXX PARAGRAPH # x = 3 2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2271	x 5 9 2 9(a)	x 1 4 3 1	The CFWARP shall archive for 15 days all products created by the CFWARP or meteorologist that are generated and disseminated to external NAS Subsystems.	D,A	D,A	X	D,A	I	D		"...and disseminated. .." should be changed to "...or disseminated"
2272	x.5.9.2.9(b)	x.1.4.3.1.1	The CFWARP shall archive for 15 days a journal, created by the CFWARP, of all products accepted by the CFWARP.	D,A	D,A	X	D,A	I	D		
	x 5.9.2.10		Data Destinations.	L	L	L	L	L	L		Lead-in
2273	x 5.9.2.10(a)	x.1 6 3.2.3.2	The CFWARP shall disseminate data or requests to 1 WMSCR.	X	D,A	D,A	D,A	I	D		
2274	x.5 9 2.10(b)	3.2.3.3	The CFWARP shall disseminate data or requests to 1 MPS.	X	D,A	D,A	D,A	I	D		
2275	x.5 9.2.10(c)	x.1.6.2.2	The CFWARP shall disseminate data or requests up to 21 WARPs.	X	D,A	D,A	D,A	I	D		
2276	x.5 9 2.11	x.1 6 3.2.3	Communications load. The CFWARP shall have the data capacity to handle the data sources and destinations with peak data rates as described in Table 3.2.1.5.9.3-1.	I,A	I,A	I,A	I,A	I	I		
2277	x 5 9 2.12	3.3.11.5	Output capacity. The CFWARP shall have a data capacity margin of 100 percent.	I,A	I,A	I,A	I,A	I	I		WARP spec reqt exceeds this reqt.
2278	x 5 9.2.13	x.1.4	Storage capacity. The CFWARP shall have the capacity to store all retained products at the maximum resolution available from the data source.	I,A	I,A	I,A	I,A	I	I		

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NAS-SS-1000 VOLUME II REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO.	VOLUME II PARAGRAPH # x = 3.2.1	FAA-E-XXXX PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
2279	x 5.9.2.14	3.2.3.4	Standard time reference. The CFWARP shall synchronize to the NAS standard time reference in accordance with 3.2.1.2.8.4 in Volume I of NAS-SS-1000. The CFWARP shall be capable of 1-second timing resolution.	X	D,A	D,A	D,A	I	D		
2280	x 5.9.2.15	X.1.5	Maintenance monitoring. The CFWARP shall meet the maintenance monitoring performance characteristics listed in 3.2.1.1.1.2 of Volume V of NAS-SS-1000 and as specified in 30.1.2 Volume I Appendix III of NAS-SS-1000.	X	T	T	T	I	D		
2281	x.5.9.3	3.2.3	Functional/physical interfaces. The CFWARP shall interface functionally and physically as shown in Figure 3.2.1.5.9.3-1. The CFWARP functional interfaces are defined in Table 3.2.1.5.9.3-1.	X	D,A	D,A	D,A	I	D	C	

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NAS-SS-1000 VOLUME V REQUIREMENTS				VERIFICATION LEVEL AND METHOD						REQ STAT	REMARKS
REQ NO.	VOLUME V PARAGRAPH # x = 3.2.1	FAA-E-XXXX PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
ALLOCATED MAINTENANCE FUNCTIONAL REQUIREMENTS											
5001	x.1.1.1.1.1 A	x.1.5.1.3.1.1	An RMS shall collect subsystem key performance data in real time by use of hardware and/or software sensors.	X	A,T	X	X	I	X		
5002	x.1.1.1.1.1 D	x.1.5.1.3.1.1	The RMS shall collect self-test and monitoring information on the status, performance, and use of its own hardware and software and make this data available to the MPS upon request.	X	A,T	A,D,T	D	I	D		
5003	x.1.1.1.1.1 E	x.1.5.1.3.1.1	The RMS shall collect operating status and performance data that includes configuration and mode of operation within the subsystem of which it is an inherent part.	X	A,T	X	X	I	X		
5004	x.1.1.1.1.3 A	x.1.5.1.3.1.1	The RMS shall receive and recognize valid commands from the MPS including those to activate the functions given in 3.2.1.1.1.1.2.3.	X	D,T	D,T	D	I	D		
5005	x.1.1.1.1.4 A	x.1.5.1.3.1.3	The RMS shall perform all collection functions including monitoring performance data, configuration data, and incoming requests at sampling rates which allow the system to detect changes commensurate with allocated RMS performance requirements.	X	A,T	A,T	X	I	X		
5006	x.1.1.1.1.4.B	x.1.5.1.3.1.3	The RMS shall accept general messages and requests for data from the MPS.	X	D	D	D	I	D		

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NAS-SS-1000 VOLUME V REQUIREMENTS				VERIFICATION LEVEL AND METHOD						REQ STAT	REMARKS
REQ NO	VOLUME V PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
5007	x.1.1.1.2.1.A	x.1.5.1.3.2.1	The RMS shall compare the measured values of the performance parameters of the subsystem with up to two sets of stored thresholds-one set defining the ideal operating range representing the best possible conditions and one set defining the acceptable operating range representing the minimum permissible conditions- and determine within which range the parameters reside.	X	A,T	X	X	I	X		
5008	x.1.1.1.2.1.B	x.1.5.1.3.2.1	The RMS shall filter or average the performance parameters to prevent the declaration of alarms due to transient conditions.	X	A,T	X	X	I	X		
5009	x.1.1.1.2.1.C	x.1.5.1.3.2.1	The RMS shall generate an alarm when a key performance parameter value is outside the acceptable operating range.	X	T	T	T	I	D,T		
5010	x.1.1.1.2.1.D	x.1.5.1.3.2.1	The RMS shall generate an alert when a key performance parameter value is outside the ideal operating range but inside the acceptable operating range.	X	T	T	T	I	T		
5011	x.1.1.1.2.1.E	x.1.5.1.3.2.1	In the event of simultaneous multiple alarm conditions, all alarms shall be stored in the RMS and the RMS shall forward for transmission to the active interface all alarms on a first-in, first-out basis.	X	A,T	A,T	A,T	I	X		
5012	x.1.1.1.2.1.F	x.1.5.1.3.2.1	The RMS shall monitor and check each and every key performance parameter value for an alarm or an alert condition at least once during each general status cycle. The time period in which the general status cycle must be completed shall be programmable from five (5) seconds to sixty (60) seconds in increments of five (5) seconds or less.	X	A,T	X	X	I	X		

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REQ NO	VOLUME V PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
5013	x.1.1.1.2.1.G	x.1.5.1.3.2.1	The RMS shall monitor and check each and every key performance parameter value, detect any changes in value, and report the changed values to the RMS/MPS interface or the RMS/MDT interface or both as required by the communications mode in effect. The time period in which the general status cycle must be completed shall be programmable from ten (10) seconds to two (2) minutes in increments of ten (10) seconds or less.	X	A,T	A,T	A,T	I	D		
5014	x.1.1.1.2.1.H	x.1.5.1.3.2.1	The RMS shall generate a general status message and a key performance parameter message at times which depend on the individual cycle time that is selected.	X	D	D	D	I	D		
5015	x.1.1.1.2.1.I	x.1.5.1.3.2.1	The RMS shall generate a return-to-normal message when a parameter causing an alarm or alert condition returns to its ideal operating range.	X	D,T	D,T	D,T	I	D		
5016	x.1.1.1.2.1.J	x.1.5.1.3.2.1	The RMS shall determine if a monitored data point, status, or condition has changed between the sampling of parameter values and generate a state change message if the state has changed.	X	D,T	D,T	D,T	I	D,T		
5017	x.1.1.1.2.1.K	x.1.5.1.3.2.1	The RMS shall initiate a diagnostic test of a subsystem, which includes fault isolation, in response to the appropriate command from an MPS or an MDT.	X	T	T	T	I	T		
5018	x.1.1.1.2.1.L	x.1.5.1.3.2.1	The RMS shall initiate a fault recovery routine if an alarm or alert is generated.	X	A,T	X	T	I	T		

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NAS-SS-1000 VOLUME V REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO	VOLUME V PARAGRAPH # x = 3.2.1	FAA-E-XXXX PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
	x.1.1.1.2.1.M		No requirement.	X	X	X	X	X	X		This requirement is missing from NAS-SS-1000, Vol V, pg 10, Oct 92.
5019	x.1.1.1.2.4.A	x.1.5.1.3.2.2	The RMS shall filter collected key performance parameter data to prevent the declaration of alarm and alert conditions due to transient conditions.	X	A,T	X	X	I	X		
5020	x.1.1.1.2.4.B	x.1.5.1.3.2.2	The RMS shall compare filtered key performance parameter values with the two sets of threshold values as part of each general status cycle to determine if an alarm or alert condition has occurred.	X	A	X	X	I	X		
5021	x.1.1.1.2.4.C	x.1.5.1.3.2.2	The RMS shall generate a report containing performance parameter values in response to a data request.	X	D,A	,AD	D	I	D		
5022	x.1.1.1.2.4.D	x.1.5.1.3.2.2	The RMS shall generate a status report containing performance parameter values in response to a data request.	X	D,A	D,A	D	I	D		
5023	x.1.1.1.2.4.E	x.1.5.1.3.2.2	The RMS shall generate a maintenance data message containing information requested by the MPS.	X	D,A	D,A	D	I	D		
5024	x.1.1.1.2.4.F	x.1.5.1.3.2.2	The RMS shall provide a date in the form of month/day/year and universal time code (UTC) in the form of hours/minutes/seconds on each message and report.	X	D	D	D	I	D		
5025	x.1.1.1.2.4.J	x.1.5.1.3.2.2	The RMS shall prepare all messages for transmission in the appropriate protocol.	X	A	A	X	I	X		

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NAS-SS-1000 VOLUME V REQUIREMENTS				VERIFICATION LEVEL AND METHOD						REQ STAT	REMARKS
REQ NO.	VOLUME V PARAGRAPH # x=3.2.1	FAA-E-XXXX PARAGRAPH # x=3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
5026	x.1.1.1.2.4.K	x.1.5.1.3.2.2	The RMS shall convert sensor input information into values directly related to engineering units such that no scaling other than decimal placement shall be required of the receiving MPS.	X	A	A	X	I	X		
5027	x.1.1.1.3.1.A	x.1.5.1.3.3.1	The RMS shall store all detected alarms and alerts until such alarm or alert condition no longer exist.	X	T	X	D	I	D		
5028	x.1.1.1.3.1.B	x.1.5.1.3.3.1	The RMS shall be able to store key performance parameter values, diagnostic results, and operating mode data in temporary storage in preparation for transferring said information to the MPS.	X	I	X	X	I	X		
5029	x.1.1.1.3.1.D	x.1.5.1.3.3.1	The RMS shall store two sets of threshold values (each set to include: an upper limit, a lower limit, or both) with one set for alarm thresholds and one set for alert thresholds in nonvolatile storage.	X	I	X	X	I	X		
5030	x.1.1.1.3.1.E	x.1.5.1.3.3.1	The RMS shall store general programs needed for filtering data, formatting messages, encoding messages, converting data, and addressing messages in nonvolatile storage.	X	I	X	X	I	X		
5031	x.1.1.1.3.1.F	x.1.5.1.3.3.1	The RMS shall store cycle time intervals for each of the cycles required by 3.2.1.1.1.1.2.1.f.	X	A	X	X	I	X		
5032	x.1.1.1.3.1.G	x.1.5.1.3.3.1	The RMS shall maintain records of the value of each monitored parameter, periodically updating each record.	X	A	X	X	I	X		
5033	x.1.1.1.3.3.A	x.1.5.1.3.3.2	The RMS shall store information needed to decode control and adjustment commands for that RMS.	X	A	X	X	I	X		

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NAS-SS-1000 VOLUME V REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO.	VOLUME V PARAGRAPH # x=3 2 1	FAA-E-XXXX PARAGRAPH # x=3 2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
5034	x.1.1 1 3 3 B	x.1 5.1.3.3.2	The RMS shall store the initialization data needed to initialize the subsystem including all site dependent parameters in non volatile memory.	X	I	X	X	I	X		
5035	x.1.1.1.3 4 A	x.1.5.1.3.3.3	The RMS shall store only filtered key performance parameter values	X	A	X	X	I	X		
5036	x.1.1.1.3.4 B	x.1.5.1.3.3.3	The RMS shall store alarm and alert threshold values, initialization tables, data required for interpreting addressing, and control and adjustment message function codes in non volatile storage.	X	I	X	X	I	X		
5037	x.1.1 1.3 4 C	x 1.5.1.3.3.3	The RMS shall update stored performance parameter values and status data at least once during the general status cycle time interval, only keeping the most current equipment performance data.	X	A	X	X	I	X		
5038	x.1 1 1 3.4 D	x.1.5 1.3.3 3	The RMS shall store the data necessary for interpreting a message function code (the code within a message used by the RMS to determine the type of message).	X	A	X	X	I	X		
5039	x 1 1 1 3 4 E	x.1.5.1.3.3 3	The RMS shall retrieve maintenance data stored in the RMS and deliver it to the requesting unit upon receipt of a valid command.	X	D,T	D,T	D	I	D		
5040	x 1.1.1.4.1 A	x.1.5.1.3.4.1	The RMS shall transfer collected subsystem performance data and status messages to the MDT and MPS upon request.	X	D,T	D,T	D	I	D		
5041	x.1.1.1.4.1 B	x.1.5.1.3.4.1	The RMS shall transfer performance parameter data as a data report to the MPS upon at a specified interval defined as the key performance parameter cycle time interval.	X	D,T	D,T	D	I	D		

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NAS-SS-1000 VOLUME V REQUIREMENTS				VERIFICATION LEVEL AND METHOD						REQ STAT	REMARKS
REQ NO.	VOLUME V PARAGRAPH # x = 3.2.1	FAA-E-XXXX PARAGRAPH # x = 3.2.1	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT		
5042	x.1.1.1.4.1.C	x.1.5.1.3.4.1	The RMS shall transfer general status information consisting of a subsystem identifier, a date and time-stamp, and an indication that the subsystem is either (1) in an alarm condition (red status), (2) alert condition (yellow status), or (3) operating properly (green status) at a specified interval defined as the general status cycle time interval.	X	A,T	A,T	D	I	D		
5043	x.1.1.1.4.1.D	x.1.5.1.3.4.1	The RMS shall transfer a state change message when such a change is determined and requires MPS notification.	X	T	T	D	I	D		
5044	x.1.1.1.4.1.E	x.1.5.1.3.4.1	The RMS shall transfer the diagnostic performance parameter values to either the MDT or the MPS when requested.	X	D,T	D,T	D	I	D		
5045	x.1.1.1.4.1.F	x.1.5.1.3.4.1	If an alarm or an alert condition is detected, the RMS shall transfer the appropriate alarm or alert message containing measured parameter values to the MPS.	X	D,T	D,T	D	I	D		
5046	x.1.1.1.4.3.A	x.1.5.1.3.4.2	The RMS shall transfer a message indicating a state change whether the change is due to an automatic process or a command.	X	D,T	D,T	D	I	D		
5047	x.1.1.1.4.3.B	x.1.5.1.3.4.2	Upon receipt of an invalid command, the RMS shall transfer a message indicating that the received command is invalid to the source of the input.	X	T	T	D	I	D		
5048	x.1.1.1.4.4.B	x.1.5.1	The RMS shall transmit data in response to a valid request from the MPS.	X	D	D	D	I	D		
5049	x.1.1.3.B	x.1.5.1.3	No RMS function shall interfere with other functions of the RMS or the subsystem of which it is a part.	X	A,I	X	X	I	X		

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NAS-SS-1000 VOLUME VI REQUIREMENTS				VERIFICATION LEVEL AND METHOD							
REQ NO	VOLUME VI PARAGRAPH # x=3 2 1	FAA-E-XXXX PARAGRAPH # x=3 1 4	DESCRIPTION	OCD	FAT	OT&E INT	OT&E OPER	OT&E SHAKE DOWN	SAT	REQ STAT	REMARKS
ACF SPACE,CRITICAL POWER AND HEAT LOAD DESIGN PARAMETERS											
6001	x 6	3.2.4.3 3.2.4.4	The WARP Processor shall meet the following minimum ACF facility requirements: (a) 100 Sq Ft of space; (b) Critical Power load of 5.0 kVA; (c) Heat load of 13,000 BTU/H.	X	I	I	X	I	I		Based on the ACF with the least radar connections.
6002	x 6	3.2.4.3 3.2.4.4	The WARP Processor shall meet the following maximum ACF facility requirements: (a) 211 Sq Ft of space; (b) Critical Power load of 17.8 kVA; (c) Heat load of 50,900 BTU/H.	X	I	I	X	I	I		Based on the ACF with the most radar connections.
6003	x 6	3.2.4.3 3.2.4.4	The WARP meteorologist workstation shall meet the following ACF facility requirements: (a) 128 Sq Ft of space; (b) Critical Power load of 4.8 kVA; (c) Heat load of 13,200 BTU/H.	X	I	I	X	I	I		Maximum allowable space.
6004	x 6	3.2.4.3 3.2.4.4	The WARP TMU/Supervisory Terminals shall meet the following ACF facility requirements: (a) 90 Sq Ft of space; (b) Essential power load of 2.4 kVA; (c) Heat load of 6,500 BTU/H.	X	I	I	X	I	I		Maximum 15 displays. Each display occupies 6 sq ft with operator access space.

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APPENDIX B

SCHEDULES

WARP Acquisition Schedules		
Activity	**Location**	**Date**
KDP 3 Validation Request	Washington, DC	Oct 93
APR Submitted	Washington, DC	Feb 94
TSARC	Washington, DC	Mar 94
Procurement Readiness Review (PRR)	Washington, DC	Mar 94
Draft Specification to Industry	Washington, DC	Apr 94
TPRC approval of pre-RFP TEMP	Washington, DC	May 94
Specification Review Board (SRB)	Washington, DC	Jun 94
Selection Plan complete	Washington, DC	Jun 94
Request For Proposal (RFP) release	Washington, DC	Jul 94
Proposals/OCDs Evaluation complete	Washington, DC	May 95
BAFOs complete	Washington, DC	Sep 95
Source Selection	Washington, DC	Sep 95
Contract Award for FSD/Limited Production	Washington, DC	Sep 95
Systems Requirement Review (SRR) Stage 1b	TBD	Nov 95
Preliminary Design Review (PDR) Stage 1b	TBD	Feb 96
DT&E Test Plan complete	Contractor	TBD
Reliability Plan complete	Contractor	TBD
Maintainability Plan complete	Contractor	TBD

WARP Acquisition Schedules		
Activity	**Location**	**Date**
Critical Design Review (CDR) Stage 1b	TBD	May 96
DT&E Test Procedure complete	Contractor	TBD
OT&E Integration Test Plan complete	FAA Tech Center	TBD
OT&E Operational Test Plan complete	FAA Tech Center	TBD
OT&E Shakedown Test Plan complete	FAA Tech Center	TBD
OT&E Integration Test Procedures complete	FAA Tech Center	TBD
OT&E Operational Test Procedures complete	FAA Tech Center	TBD
OT&E Shakedown Test Procedures complete	FAA Tech Center	TBD
Test Readiness Review (TRR)	TBD	Jan 97
DT&E FAT (validated) : Stage 1b complete	Factory(1st WARP)	Jan 97
DT&E SAT (validated) : Stage 1b complete	Key sites (1st WARP)	Apr 97
OT&E Systems Delivered : Stage 1b	FAA Tech Center, key sites	Apr 97
OT&E Integration Test : Stage 1b complete	FAA Tech Center, key sites	May 97
OT&E Operational Test : Stage 1b complete	FAA Tech Center, key sites	Jun 97
OT&E Shakedown Test : Stage 1b complete	FAA Tech Center, key sites	Jun 97
TPRC approval of pre-KDP 4 TEMP updates	TBD	Aug 97
Stage 1b Deployment Readiness Review EXCOM	Washington, DC	Aug 97
KDP 4 Approval Request Stage 1b	Washington, DC	Sep 97

WARP Acquisition Schedules		
Activity	**Location**	**Date**
WARP Stage 1b delivered to 1st Key Sites	Key Sites	Sep 97
Field Shakedown : Stage 1b start	Key Sites	Sep 97
ATQ Operational Assessment	TBD	Sep 97
1st ORD Stage 1b	1st Site and/or ATCSCC	Sep 97
PAT&E FAT Stage 1b (conformance) start	Factory(2nd thru Last)	TBD
PAT&E SAT Stage 1b start	2nd thru Last Sites	TBD
SRR Stage 1a	TBD	Nov 95
PDR Stage 1a	TBD	Feb 96
CDR Stage 1a	TBD	Feb 97
TRR Stage 1a	TBD	Jun 97
DT&E FAT follow-on : Stage 1a complete	Factory	Jul 97
DT&E SAT follow-on : Stage 1a complete	Key sites (1st WARP)	Aug 97
OT&E Systems delivered : Stage 1a	FAA Tech Center, key sites	Aug 97
OT&E Integration follow-on : Stage 1a complete	FAA Tech Center or key sites	Sep 97
OT&E Operational follow-on : Stage 1a complete	FAA Tech Center or key sites	Dec 97
OT&E Shakedown follow-on : Stage 1a complete	FAA Tech Center or key sites	Jan 98
Stage 1a Deployment Readiness Review EXCOM	Washington, DC	Jan 98
KDP Approval Request Stage 1a	Washington, DC	Feb 98

WARP Acquisition Schedules		
Activity	**Location**	**Date**
WARP Stage 1a delivered to Key Sites	Key sites	Feb 98
Field Shakedown : Stage 1a start	Key sites	Feb 98
1st ORD Stage 1a	Key Sites	Feb 98
PAT&E FAT Stage 1a (conformance) start	Factory(2nd thru Last)	TBD
PAT&E SAT Stage 1a start	2nd thru Last Sites	TBD
Data Reduction and Analysis	FAA Tech Center	TBD
ATQ Operational Assessment	TBD	TBD
Draft Test Report	FAA Tech Center	TBD
SRR Stage 2	TBD	Nov 95
PDR Stage 2	TBD	Mar 97
CDR Stage 2	TBD	Oct 97
TRR Stage 2	TBD	May 98
DT&E FAT follow-on : Stage 2 complete	Factory	Jul 98
DT&E SAT follow-on : Stage 2 complete	Key sites (1st WARP)	Jul 98
OT&E Integration follow-on : Stage 2 complete	FAA Tech Center or key sites	Aug 98
OT&E Operational follow-on : Stage 2 complete	FAA Tech Center or key sites	Aug 98
OT&E Shakedown follow-on : Stage 2 complete	FAA Tech Center or key sites	Sep 98
WARP Stage 2 delivered to Key Sites	Key sites	TBD

WARP Acquisition Schedules		
Activity	**Location**	**Date**
Field Shakedown : Stage 2 start	Key Sites	TBD
1st ORD Stage 2	Key Sites	TBD
PAT&E FAT Stage 2 (conformance) start	Factory(2nd thru Last)	TBD
PAT&E SAT Stage 2 start	2nd thru Last Sites	TBD
Data Reduction and Analysis	FAA Tech Center	TBD
ATQ Operational Assessment	TBD	TBD
Quick Look Test Report (OT&E Shakedown)	FAA Tech Center	TBD
Draft Test Report	FAA Tech Center	TBD

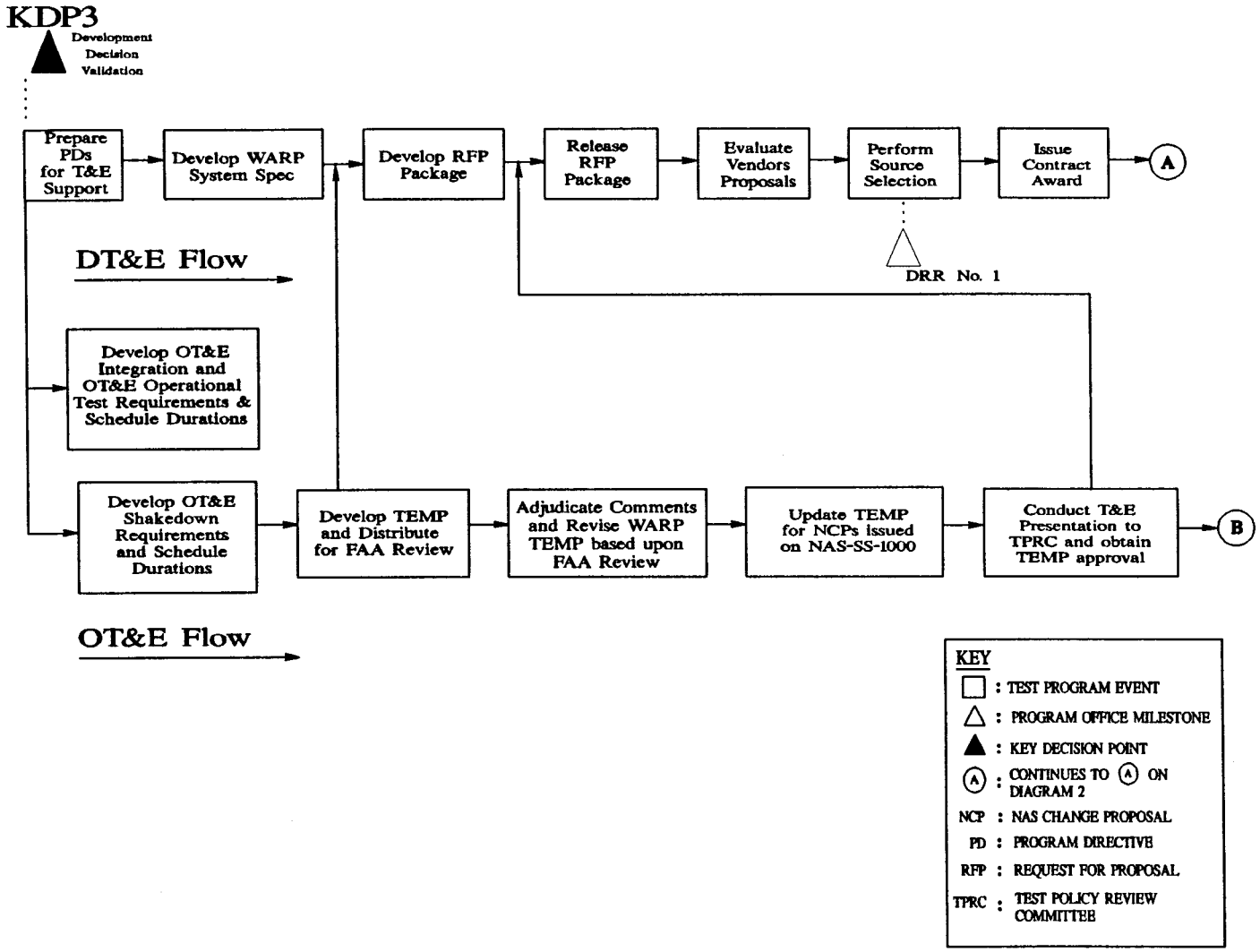
TABLE 1

WARP Testing Resources

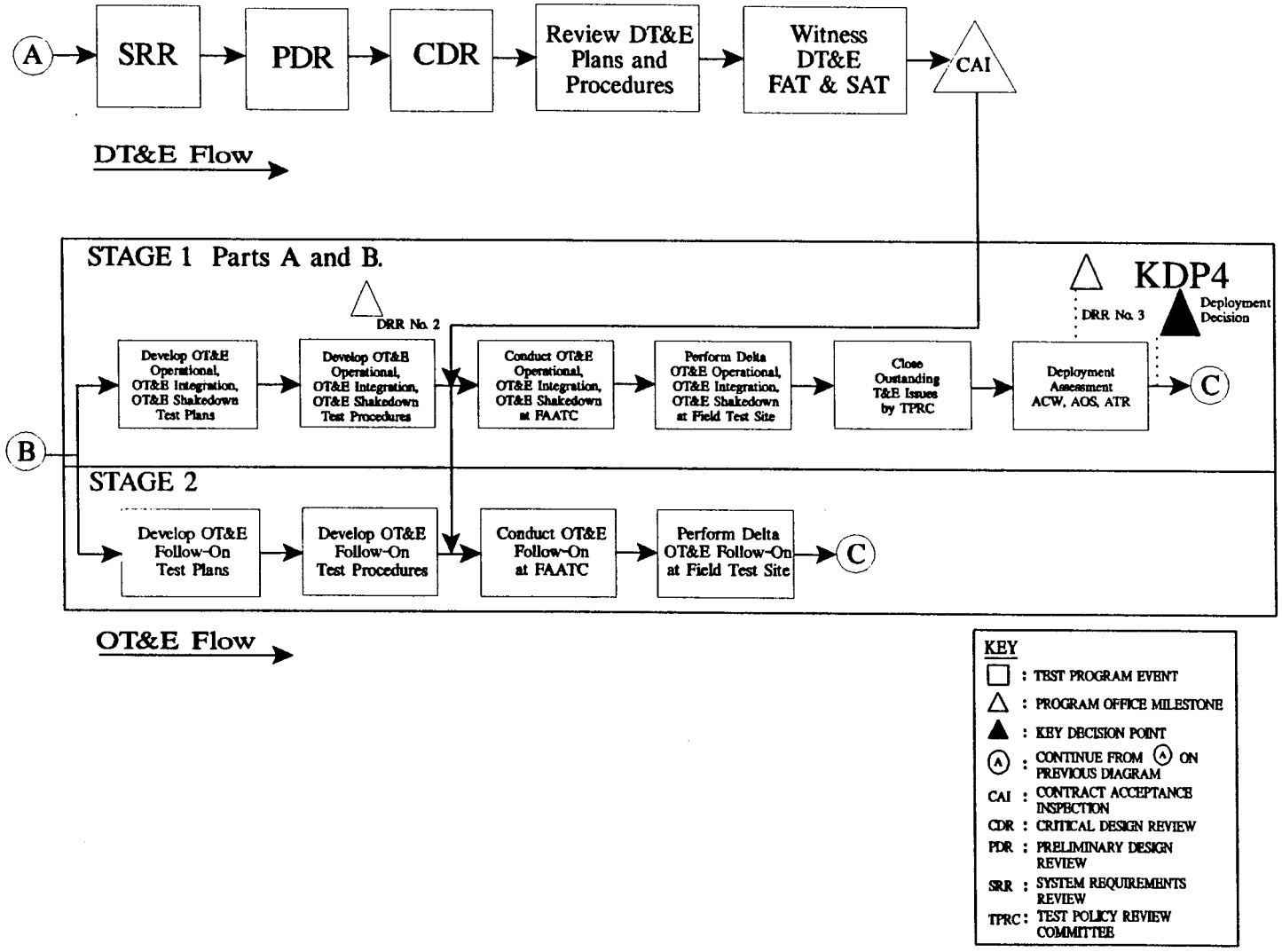
Organization	FY	FAA In House	Contractor	Stage
ACW-200B	97	1.3 E.Y.	3 Test Engineers 1 Meteorologist 1 Human Factors Specialist	1A/1B
	98	1.3 E.Y.	3 Test Engineers 1 Meteorologist 1 Human Factors Specialist	1A/1B
	99	1.3 E.Y.	2 Test Engineers 1 Meteorologist 1 Human Factors Specialist	2,3
	00	1.3 E.Y.	TBD	3

APPENDIX C

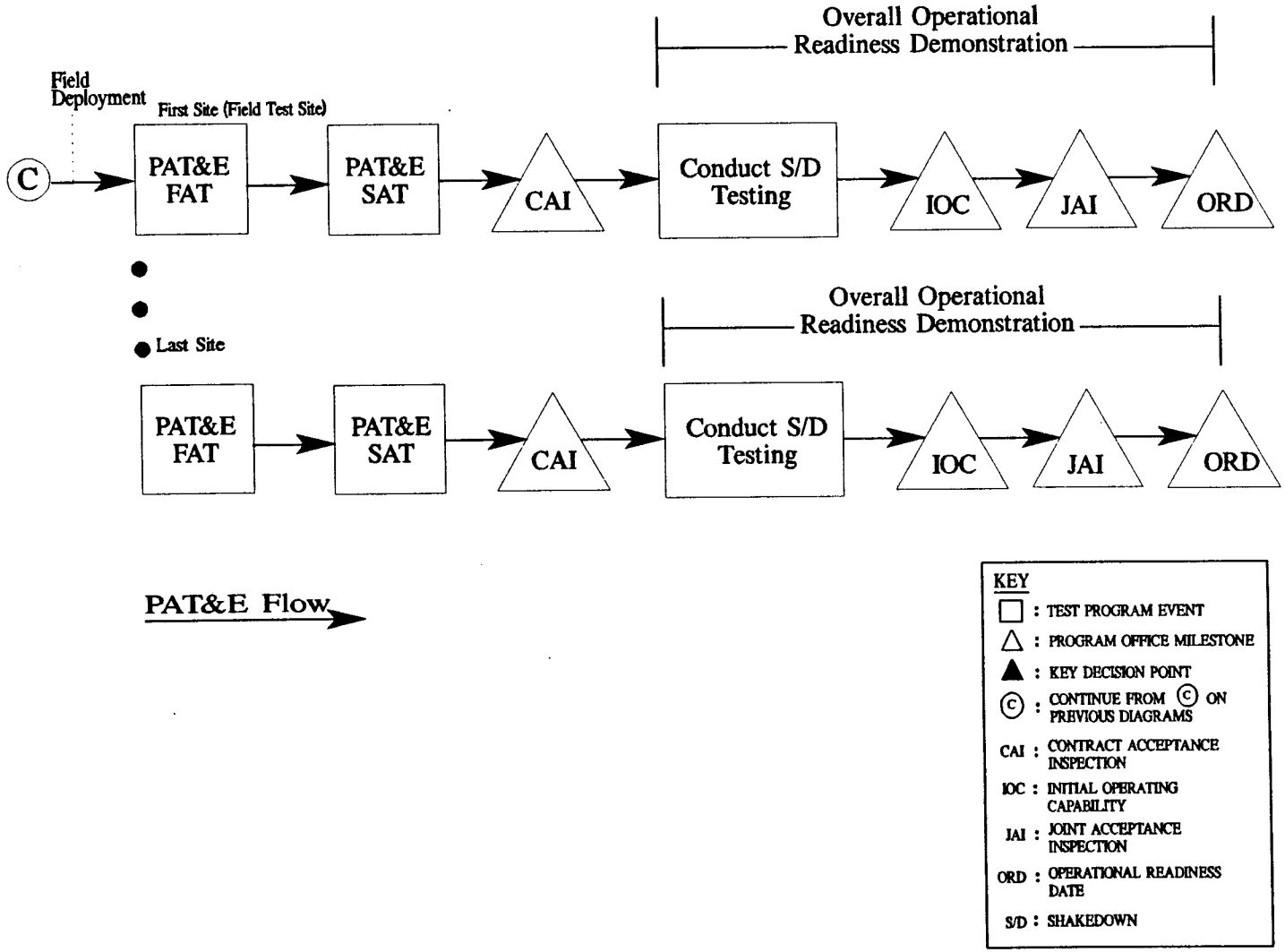
TEST FLOW DIAGRAMS



OT&E and DT&E Flow Diagram for WARP Pre-Contract Award Activities.



OT&E and DT&E Flow Diagram for WARP Stages 1 and 2.



PAT&E Flow Diagram for WARP Stages 1 and 2.